Microsoft®
Operating System/2
User's Guide

Computer
Museum

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Microsoft Corporation

Contents

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Welcome

The *Microsoft® Operating System/2 User's Guide* is designed to be a comprehensive, easy-to-use guide to Microsoft Operating System/2 (MS OS/2), including the graphical environment of Presentation Manager and the powerful multitasking capabilities of MS OS/2.

This guide is divided into three parts and has a terminology section and two appendixes ("ANSI Escape Sequences" and "Running DOS from Your Hard Disk"). It is designed for both beginning users and those who are familiar with advanced computer topics.

In this guide, you will find the following parts:

Part I: Using Presentation Manager

Chapters in this part explain basic concepts that you will need when working in the graphical environment of Presentation Manager:

- Using Presentation Manager windows
- Starting applications
- Working with files, directories, and disks
- Printing
- Changing system settings

Part 2: Using Cmd and the DOS Session

Chapters in this part describe using **cmd**, the MS OS/2 command interpreter, and **command**, the DOS command interpreter. The following topics are discussed:

- Using **cmd** commands
- Writing batch programs
- Using MS OS/2 utility programs to manage files, directories, and disks
- Using DOS
- Using the System Editor

Part 3: Configuring and Maintaining Your System

Chapters in this part describe how to customize your system by doing the following:

- Creating start-up files
- Changing your CONFIG.SYS file
- Changing system hardware

How to Use This Guide

This guide is organized as a comprehensive reference and is arranged by task. It is not necessary to read it straight through. You are given instructions for accomplishing each task; some shortcuts and alternative methods are also provided.

Notational Conventions

To help you locate and interpret information easily, this guide uses specific typographic conventions and a standard syntax format and terminology. The following typographic conventions are used in this guide:

Convention	Used for
bold	Command-line commands, utilities, options, and portions of syntax that you must type exactly as shown.
italic	Variables and placeholders that represent information you must provide.
`monospace`	Sample command lines, program code, program output, and examples.
ALL CAPITALS	Filenames, directory names, and acronyms.
SMALL CAPITALS	Names of keys on your keyboard.
Initial Capitals	Presentation Manager commands and menu names.

Key combinations and key sequences appear in the following format:

Notation	Meaning
KEY+KEY	A plus sign (+) between keynames means you must press the keys at the same time; for example, "Press ALT+ESC" means that you press the ALT key and hold it down while you press the ESC key.
KEY, KEY	A comma (,) between keynames means you must press the keys in sequence; for example, "Press ALT, SPACEBAR" means that you press the ALT key and release it, and then press the SPACEBAR and release it.
DIRECTION keys	Arrow keys on your computer keypad indicate DIRECTION keys. The names refer to the direction the arrow on the key points: UP, DOWN, RIGHT, and LEFT.

Syntax Conventions

Syntax represents the order in which you must type a command-line command or utility and any arguments and options that follow it. You may type commands, arguments, and options in either uppercase or lowercase letters. The following elements are used in syntax lines in this guide:

Notation	Meaning
[ ]	Indicates optional items. To include the optional information described within the brackets, type only the information, not the brackets themselves.
drive:	Specifies a disk drive. You need to specify a drive name along with a filename only if you are using a file that is *not* on the current drive. The colon (:) must be typed as shown.
path	Specifies a complete directory path, using the following syntax:

[*directory*...][*directory*...]*directory*

You need to specify a path with a filename only if the file is not in the current directory.

filename	Specifies a file and includes a filename extension; for example, REPORTS.AUG.
...	Indicates that an argument can be repeated several times in a command line. Type only the information, not the ellipsis (...) itself.

Using a Mouse and the Keyboard

You can use both a mouse and the keyboard with MS OS/2. In this guide, textured bars point out instructions for performing a particular task. If separate sets of instructions are provided for the mouse and the keyboard, the mouse procedure is described first. The following icons appear in the left margin:

Mouse icon   Keyboard icon

You can use either a single-button or a multiple-button mouse with Presentation Manager. If you have a mouse with more than one button, use the left button. Your applications may respond to other buttons, but Presentation Manager recognizes the left button. You can change which button Presentation Manager recognizes. For information about how to do this, see Chapter 6, "Changing System Settings with Control Panel."

The following list describes mouse actions used in this guide:

Action	Meaning
Point	Move the mouse pointer until the tip rests on a specific object or area on your screen.
Click	Press and release the mouse button. To click an object means to point to that object (for example, an icon or a menu name) and press and release the mouse button.
Double-click	Press and release the mouse button twice in rapid succession.
Drag	Press the mouse button and hold it down while moving the mouse pointer.

Part 1

Using Presentation Manager

In this part of the *Microsoft Operating System/2 User's Guide*, you will find instructions on everything from basic tasks, such as looking at your files and directories or starting applications, to more complex tasks, like setting up a printer and changing system settings.

You will learn how to use File System and Control Panel to work with your files and directories, as well as how to adjust the system settings in Presentation Manager. And you will learn about using MS OS/2 utilities such as **chkdsk** and **format**.

You will be able to use these skills to work with any application written for the graphical Presentation Manager environment.

Part 1
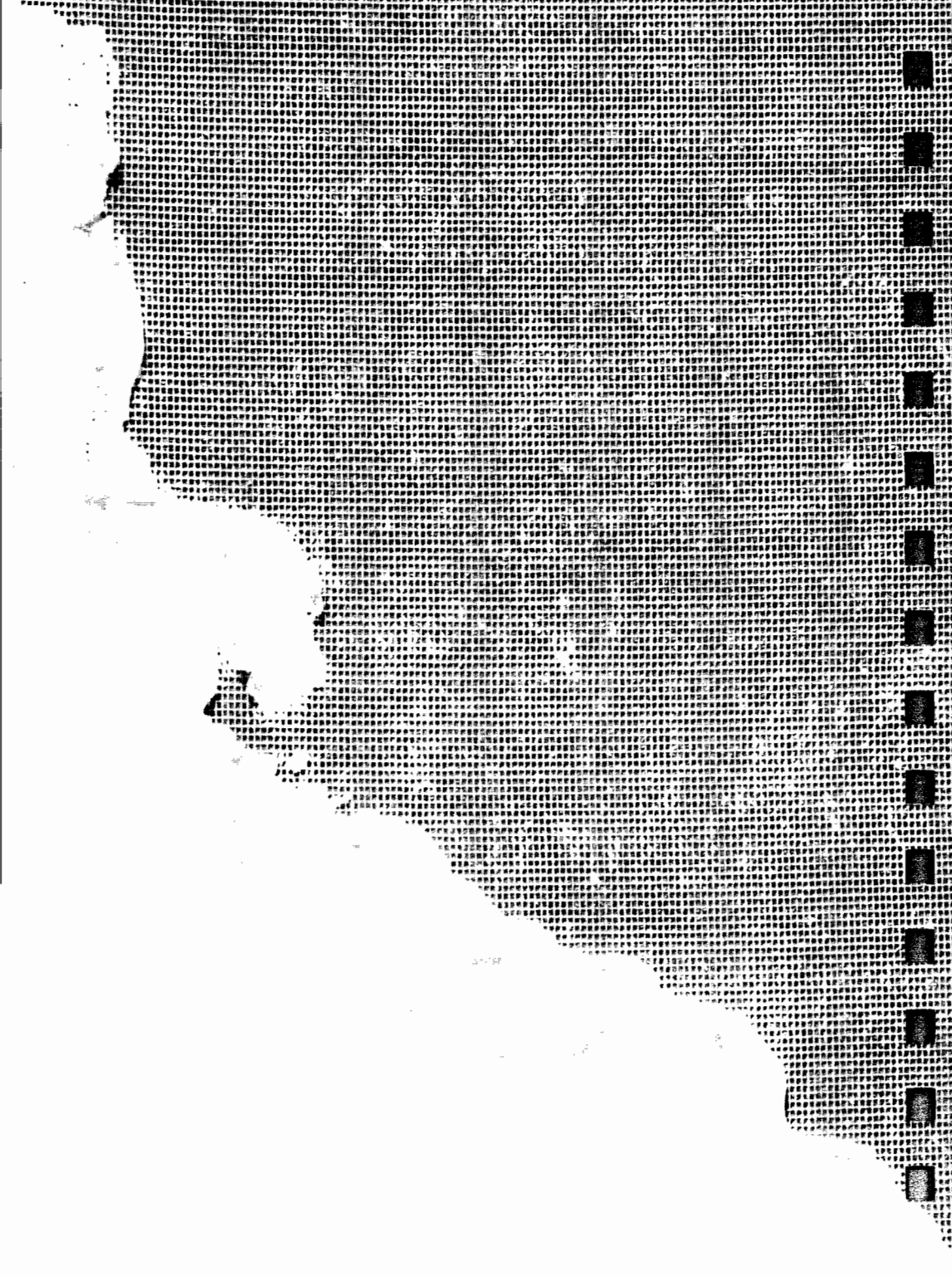
1 Presentation Manager Skills

Introduction

Presentation Manager is a graphical environment within Microsoft Operating System/2 (MS OS/2) that presents applications in windows and is designed to provide an easy-to-use, standard interface for applications. You can quickly switch from one application to another by using a mouse button or the keyboard. If you have not worked with a graphical interface before, there are a few skills and terms you need to learn. Once you have mastered these skills, you can use them with any Presentation Manager application. This chapter provides information on the following Presentation Manager skills:

- Selecting menus
- Choosing commands
- Completing dialog boxes
- Sizing, moving, and arranging windows
- Using icons
- Getting Help information

Presentation Manager Basics

In Presentation Manager, applications run in windows. These windows divide your screen so that you can see several different applications at once. With Presentation Manager, you have several ways you can arrange windows and control applications.

Menu bar   Minimize box
System-menu box   Maximize box
Title bar   Selection cursor

```
┌─────────────────────────────────────────────┐
│                                               │
│                                               │
│          ┌──────────────────────────┐         │
│          │ ▬  ░░ Start Programs  ░░ ⬇ ⬆ │         │
│          │ Program  Group      F1=Help │         │
│          │        Main Group           │         │
│          │ File System              ⬆  │         │
│          │ OS/2 full-screen command prompt│      │
│          │ OS/2 windowed command prompt│         │
│          │                             │         │
│          │       ▷                     │         │
│          │                             │         │
│          │                          ⬇  │         │
│          └──────────────────────────┘         │
│                                               │
│   DOS  🖳                                   ▦  │
│                                               │
└─────────────────────────────────────────────┘
```

Icon area   Work area   Scroll bar
Window border
Mouse pointer
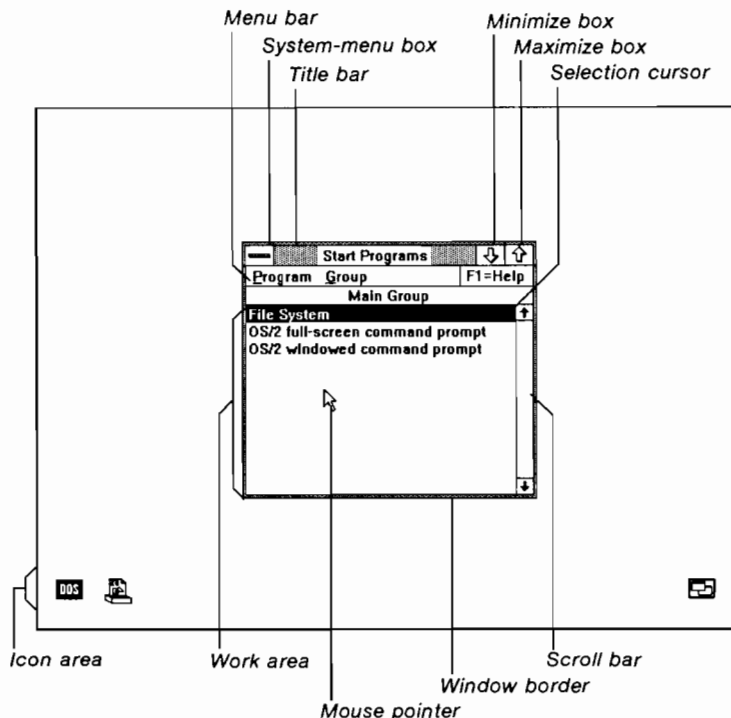
The Presentation Manager Window

Here are some terms that will help you learn about and use Presentation Manager windows:

- The *selection cursor* shows where you are on your screen. If you have a mouse installed, you will also see an *arrow pointer*.

- The *work area* is where you do most of your work with an application. For example, if you start a text editor, the contents of a document file appear in the work area. In Start Programs, the first application you see when you start Presentation Manager, the work area contains a list of applications you can start.

- The *title bar*, located at the top of each application window, displays the name of the application.

- The *menu bar* contains the names of the command menus in an application.

- The *System-menu box* displays the System menu. This menu is common to all Presentation Manager applications. You use its commands to size, move, and close windows, and to switch to other applications.

- The *Maximize box* enlarges your windows. If you don't have a mouse, you can use the Maximize command from the System menu.

- The *Minimize box* shrinks your windows to icons. If you don't have a mouse, you can use the Minimize command from the System menu.

- The *icon area* is the area along the bottom of your screen. When you shrink application windows to icons, the icons appear in this area. When you first start Presentation Manager, the icons for the DOS session, Spooler Queue Manager, and Task Manager appear at the bottom of your screen.

About Selecting

In Presentation Manager, you must select the area or object your next action is going to affect. You select a window and then work in it, you select a command and then MS OS/2 carries it out, you select an area within a file and then do something to it. The way you select varies, depending on the task. Selections are displayed in a variety of ways. Remember this basic concept: first select, then carry out the action.

Presentation Manager always shows you where you are in a window and what you've selected. The selection cursor identifies your place in a window. You move the selection cursor using either a mouse or the keyboard. The selection cursor changes shape, depending on the kind of application you're working with and the kind of task you're trying to accomplish. For example, in dialog boxes, the selection cursor is a dotted box that shows you which dialog-box control is selected.

Selecting Items in Windows

In the work area of many windows, you can select only one item at a time; for example, a disk drive or an application.

```
━━━ ▓▓▒ Start Programs ▒▓▓      ⬇  ⬆
Program  Group                  F1=Help
              Main Group
File System                             ⬆
OS/2 full-screen command prompt
OS/2 windowed command prompt



                                        ⬇
```

To select an item by using a mouse, do the following:

▶ Click the item.

To select an item by using the keyboard, do the following:

▶ Press the DIRECTION keys to move the selection cursor to the item.

In some windows, you can select several objects at once. This action is called extending a selection. For more information, see the next section, "Extending a Selection in a Window."

Extending a Selection in a Window

In some windows, you can extend a selection to include more than one item; for example, a block of files that are next to each other or a group of files scattered throughout a window.

To select a block of several items by using a mouse, do the following:

1 Click the first item in the block that you want to select.
2 Press and hold down SHIFT and click the last item in the block.

To select a block of several items by using the keyboard, do the following:

▶ Press SHIFT+DIRECTION key.

To select a group of scattered items by using a mouse, follow these steps:

▶ Press and hold down CTRL and click the items you want to select.

To select a group of scattered items by using the keyboard, do the following:

1 Press the DIRECTION keys to move to each item.
2 Press the SPACEBAR when you reach an item you want to select.

If you are using a mouse, you can cancel any selection from a group of selected items by doing the following:

▶ Click the selected item again and press the SPACEBAR.

To cancel a selection by using the keyboard, do the following:

1 Press the DIRECTION keys to move to the item.
2 Press the SPACEBAR.

Selecting the Active Window

In Presentation Manager, the application window you are currently working in is called the *active window*. The active-window title bar is a different color to distinguish the active window from other windows. Each time you start Presentation Manager, three Presentation Manager applications start automatically: Start Programs, Task Manager, and Spooler Queue Manager. The DOS session, a special environment for running DOS programs, starts as well. You can also start applications that run in a full screen rather than in the Presentation Manager window. When you are running more than one application at time, you must select the application you want to work in.

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There are several ways to switch between applications. In this section, some of the methods for moving between applications are summarized. For more complete information on running applications, see Chapter 2, "Running Applications with MS OS/2."

You can use Task Manager to switch between applications. Task Manager maintains a list of all the applications you are running.

```
━━  ▒▒ Task Manager ▒▒▒   ⬇  ⬆
Task  Arrange  Shutdown   F1=Help
DOS Command Prompt                ↑
Start Programs
Spooler Queue Manager
                                  ↓
```
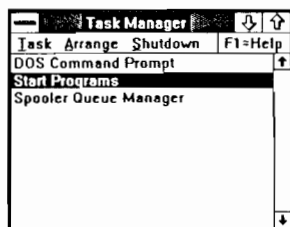
To switch to Task Manager by using a mouse, do the following:

▶ Double-click the Task Manager icon.

To switch to Task Manager by using the keyboard, do the following:

▶ Press CTRL+ESC.

To switch to another application by using a mouse, do the following:

▶ Double-click the application title.

To switch to another application by using the keyboard, do the following:

[1] Press the DIRECTION keys to select the application title.
[2] Press ENTER.

You can also switch directly to an application without using Task Manager. There are several techniques, depending on whether the application is running in a window and whether or not you use a mouse.

If an application is visible in the Presentation Manager screen, you can switch to it by using a mouse:

▶ To switch to an application running in a window, click the application window.

Or

▶ To switch to an application running as an icon, double-click the icon.

You can use the following key combinations to switch between applications by using the keyboard:

To switch	Press
Between applications running in windows	ALT+TAB
Between all applications, including full-screen applications	ALT+ESC

Continue using the key combination until the application you want appears.

For more information on running applications and using Task Manager, see Chapter 2, "Running Applications with MS OS/2."

Commands and Menus

Presentation Manager commands are organized in *menus*. Each application has its own menus, with a System menu common to all applications. The System menu is represented by a box in the upper-left corner of each window; all other menus are represented by names in the menu bar below the title bar at the top of each window.

In Presentation Manager, you select a menu, then choose a command from that menu. Choosing a command carries out an action.

Choosing a Command

You can choose a command by using either a mouse or the keyboard.

To choose a command by using a mouse, do the following:

1. Click the menu name on the menu bar.
2. Click the command name.

If you're using the keyboard, you have two ways to choose commands from menus: the basic method and the direct-access method.

The basic method uses the DIRECTION keys. To choose a command by using the basic method, do the following:

1. Press ALT or F10 to select the menu bar.
2. Press the LEFT or RIGHT keys to select a menu on the menu bar.
3. Press ENTER to display the menu.
4. Press the UP or DOWN keys to select the command you want.
5. Press ENTER to choose the command.

If your application shows underlined letters in command and menu names, you can use the direct-access method. To choose a command by using the direct-access method, do the following:

1. Press ALT or F10.
2. Press the underlined letter in the menu name.

Underlined letters in menu names

```
┌──────────────────────────────────────────────────────────┐
│ ─        File System                              ⬇ ⬆     │
│ File  Options  Tree  Arrange  Window  Exit        F1=Help │
│ ┌─        Directory Tree ─────────────────────┐           │
│ Ctrl+letter selects a drive.                              │
│ ⊕A   ⊕B   ⊟C                                             │
│ ┌──────────────────────────────────────────┐             │
│ [RALPH] C:\                                               │
│ ▣                                                         │
│ └─ OS2                                                    │
│     ├─ DLL                                                │
│     ├─ INSTALL                                            │
│     ├─ INTRO                                              │
│     └─ SYSTEM                                             │
│   ├─ REPORTS                                              │
│   └─ SPOOL                                                │
│                                                           │
└──────────────────────────────────────────────────────────┘
```
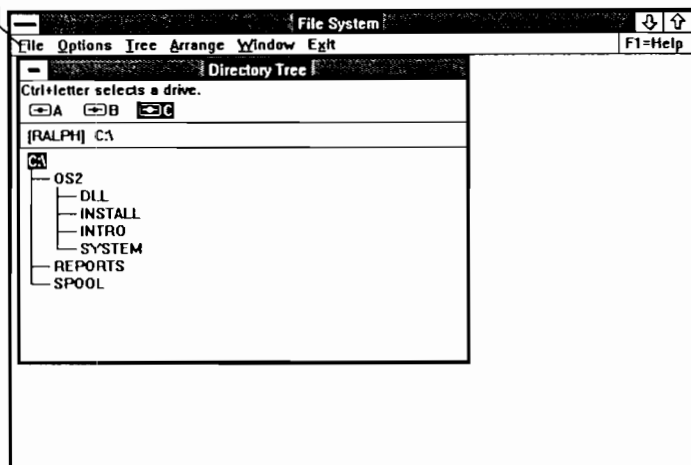
3 Press the underlined letter in the command name.

Note If more than one menu or command name shares the same underlined letter, Presentation Manager selects the first menu or command listed. Press the underlined letter again to select the next menu or command. To see the menu or choose the command, press ENTER.

If you decide you don't want to choose a command, you can cancel the menu.

If you are using a mouse, you can cancel a menu without making another selection, by doing the following:

▶ Click in a blank area outside the menu.

To cancel a menu and move back to the application work area by using the keyboard, do the following:

▶ Press ALT or F10.

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Pressing ESC also cancels the menu; however, the selection cursor remains on the menu bar so that you can select another menu. To move back to the application work area, press ESC again.

A *check mark* next to a command name on a menu indicates the command has been chosen and is active.

```
┌─────────────────┐
│ Preferences     │
├─────────────────┤
│  Screen colors...│
│  Border width... │
│ ✓Warning beep    │
│  Mouse...        │
│  Logo display... │
│  Country...      │
└─────────────────┘
```

An *ellipsis* (...) next to a command name on a menu indicates that a dialog box will appear when the command is selected. For more information, see "Using a Dialog Box," later in this chapter.

The System Menu

In addition to application menus, a System menu appears in the upper-left corner of each window; it is represented by the System-menu box.

System-menu box

```
┌──┬──────────────────────┬───┬───┐
│──│ ▒▒▒ Start Programs ▒▒▒│ ⇩ │ ⇧ │
├──┴──────────────┬────────┼───┴───┤
│ Restore         │ Alt+F5 │ F1=Help│
│ Move            │ Alt+F7 │       │
│ Size            │ Alt+F8 │      ↑│
│ Minimize        │ Alt+F9 │ mpt   │
│ Maximize        │ Alt+F10│ mpt   │
├─────────────────┴────────┤       │
│ Task Manager    Ctrl+Esc │       │
│                          │       │
│                          │       │
│                          │       │
│                          │      ↓│
└──────────────────────────┴───────┘
```
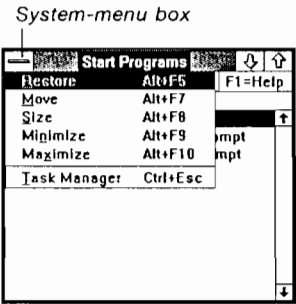
You use System-menu commands to manipulate windows; for example, to change their size or move them on your screen, and to switch

between applications. Some dialog boxes also have System menus. The
following table describes the System-menu commands:

Command	Action
Restore	Restores a window to its former size after it has been enlarged (by using the Maximize command) or shrunk to an icon (by using the Minimize command).
Move	Moves a window to another position on your screen.
Size	Changes the size of a window.
Minimize	Shrinks a window to an icon.
Maximize	Enlarges a window to its maximum size.
Close	Closes a window.
Task Manager	Selects the Task Manager window (Task Manager lists the programs you have running and lets you choose which one you want to work in).

Some applications do not have all of these commands listed on their
System menus. For example, the Close command is not on the System
menu in Start Programs because you cannot close the Start Programs
window.

Although you choose commands from the System menu as you would
from any other menu, you select the System menu in a different way.

To select the System menu by using a mouse, do the following:

► In a window, click the System-menu box in the upper-left corner of
the window; in an icon, click the icon.

To select the System menu by using the keyboard, do the following:

► Press ALT+SPACEBAR or SHIFT+ESC.

You can then use either the basic method or the direct-access method
to choose the command you want.

Commands in Work-Area Windows

In some applications, such as File System, you can open windows within the application work area. These windows also have System menus but you select them a little differently.

System-menu box
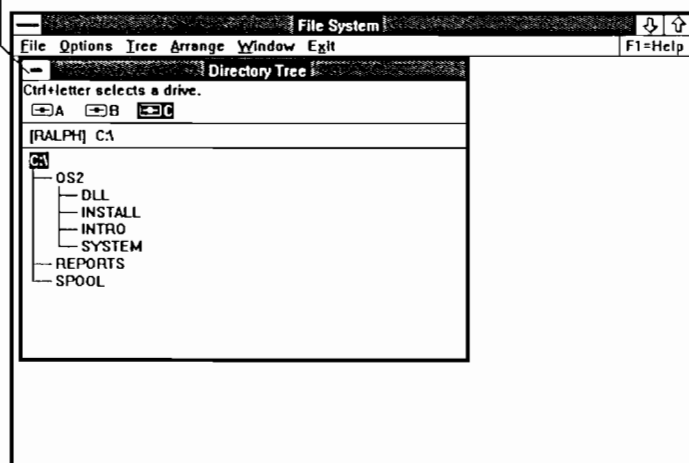
```
┌─────────────────────────────────────────────────────┬───┬───┐
│ ─         ▓▓▓▓▓▓▓▓▓▓▓ File System ▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓  │ ⇩ │ ⇧ │
├─────────────────────────────────────────────────────┴───┴───┤
│ File  Options  Tree  Arrange  Window  Exit           │F1=Help│
│ ┌─     ▓▓▓▓▓▓▓▓▓▓▓ Directory Tree ▓▓▓▓▓▓▓▓▓▓▓         │       │
│ │Ctrl+letter selects a drive.                         │       │
│ │⊕A   ⊕B   ⊟C                                         │       │
│ │[RALPH] C:\                                          │       │
│ │ C:\                                                 │       │
│ │  ├─ OS2                                             │       │
│ │  │    ├─ DLL                                        │       │
│ │  │    ├─ INSTALL                                    │       │
│ │  │    ├─ INTRO                                      │       │
│ │  │    └─ SYSTEM                                     │       │
│ │  ├─ REPORTS                                         │       │
│ │  └─ SPOOL                                           │       │
│ │                                                     │       │
│ │                                                     │       │
└──────────────────────────────────────────────────────────────┘
```

To select the System menu from a window within an application by using a mouse, do the following:

▶ Click the System-menu box in the window.

To select the System menu from a window within an application by using the keyboard, do the following:

[1] Press SHIFT+ESC to select the System menu in the main application window.

[2] Press the RIGHT key.

The following is a shortcut for selecting the System menu from a window in an application by using the keyboard:

▶ Press and hold down CTRL and press – (hyphen key).

System-menu commands

```
┌───────────────────────────── File System ──────────────────── ⇩ ⇧
│ File  Options  Tree  Arrange  Window  Exit                    F1=Help
│ ┌─ ──────────────────── Directory Tree ────────────────────────
│ │ Restore    Ctrl+F5
│ │ Next       Ctrl+F6
│ │ Move       Ctrl+F7
│ │ Size       Ctrl+F8
│ │ Minimize   Ctrl+F9
│ │ Maximize   Ctrl+F10
│ │ Close      Ctrl+F4
│ │   ├─ INTRO
│ │   └─ SYSTEM
│ │ ─ REPORTS
│ │ └─ SPOOL
```
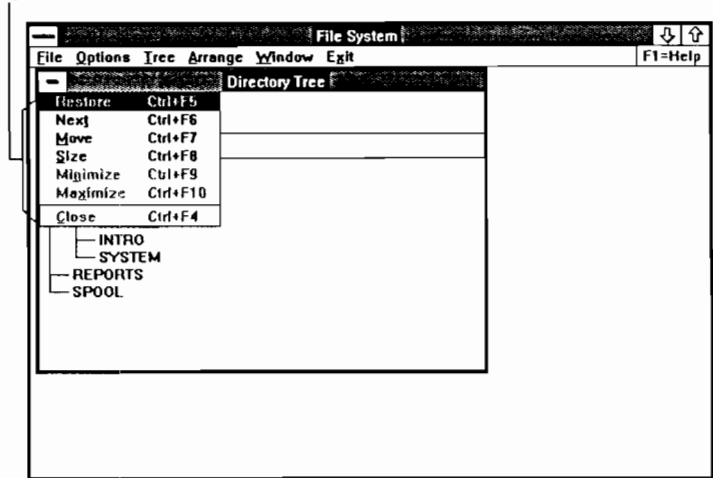
The commands on the System menu of a work-area window vary depending on the application; for example, in some Presentation Manager applications you cannot enlarge work-area windows by using the Maximize command. For more information, see your application manual.

Inactive Commands

When you see a command name grayed on its menu, it means the command is inactive and cannot be used.

Inactive commands

```
─────────────── Control Panel ───────────── ⇩
 Restore      Alt+F5    ion  Exit       F1=Help
 Move         Alt+F7
 Size         Alt+F8
 Minimize     Alt+F9    ┌─Date────────
 Maximize     Alt+F10    │ 10-26-88
 Close        Alt+F4
 Task Manager Ctrl+Esc
  ┌─Cursor Blink─┐      ┌─Double-Click──┐
  │ Slow    Fast │      │ Slow    Fast  │
  │ ←░░   ░░→   │      │ ←░░   ░░→    │
  │        │      │      │   ┌─TEST─┐    │
  └──────────────┘      └───────────────┘
```
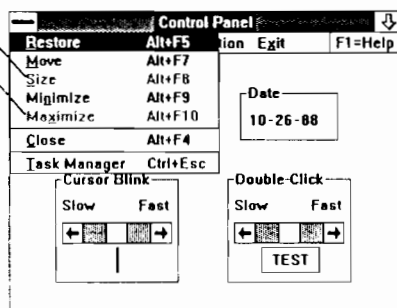
You may have to select something before you can use the command, or
it may be that the command cannot be used with your application; for
example, the Control Panel window has a fixed size, so you cannot use
either the Maximize or the Size command.

Shortcut Keys

Some menus have shortcut keys, usually listed to the right of the com-
mand name. Often these keys are a combination of a function key and
the ALT or CTRL key. You use these keys to choose a command without
first selecting the menu where the command is located. The following
list shows the System-menu shortcut keys:

Command	Press
Restore	ALT+F5
Move	ALT+F7
Size	ALT+F8
Minimize	ALT+F9
Maximize	ALT+F10
Close	ALT+F4
Task Manager	CTRL+ESC

For example, to enlarge a window by using the shortcut keys for the
Maximize command, you select the window and press ALT+F10.

Using a Dialog Box

Presentation Manager displays a dialog box when additional information is needed to carry out a command. The dialog box contains areas where you provide information; there are different kinds of areas, depending on the kind of information needed.
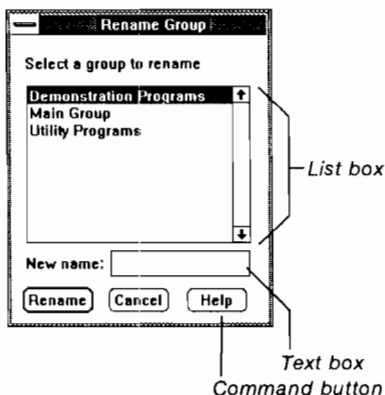
The following are a few terms that will help you learn about and use dialog boxes:

- The *text box* is where you type information. The text you type appears to the left of the *insertion point*, a flashing vertical line.
- A *list box* contains the names of available choices. For example, in the preceding illustration the names of program groups appear in a list box.
- A *command button* carries out a command when it is chosen. These buttons have labels that indicate what they do; for example, Rename, Cancel, or Help. Choosing a command button may cause another dialog box to be displayed. For example, choosing the Help button causes a Help dialog box to appear.

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Option button

Display Options

Name | *.*

┌─ Include ─────────────────────────┐
File types
● All files   ○ Programs only
○ Directories only   ○ Data files only

File attributes
☒ Read-only files
☒ All other attributes   ☐ Hidden files

┌─ Display ──────────┐ ┌─ Sort by ──────┐
☐ Full file details   ● Name
☒ Directory size   ○ Extension
                        ○ Date and time
                        ○ Size

[Set display]   [Cancel]   [Help]
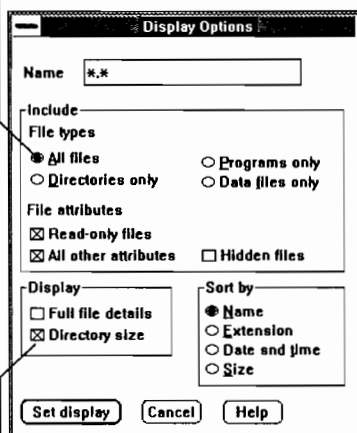
Check box

- A round *option button* lets you select an option for a particular command. In a group of option buttons, only one option at a time can be selected.
- A square *check box* also lets you select an option for a particular command. In a group of check boxes, several or all options can be selected at one time.
- A *grayed command* or *grayed option* is inactive, which means that it cannot currently be used.

Dialog boxes usually display information that reflects what you have selected on your screen; for example, a filename in File System. They also display previously selected options or Presentation Manager default options.

Moving in a Dialog Box

You can move around a dialog box to make several selections from different groups of options. The area you are working in is usually marked by a selection cursor or a flashing insertion point. Often, moving to an area selects the area as well.

In some cases, you must move within an area to select one option from a group of options; for example, a filename within a list box or one option button in a group of option buttons.

If you are using a mouse, you can move to and select any item or area in a dialog box by doing the following:

▶ Click the item or area.

If you are using the keyboard, you can move from area to area in a dialog box by doing the following:

▶ Press TAB.

To move in the opposite direction through a dialog box, do the following: the following:

▶ Press SHIFT+TAB.

Often, you can select an area by moving to it. However, sometimes you must also make a selection in the area; for example, when you move to a check box. To select the option, do the following:

▶ Press the SPACEBAR.

You can cancel a selection by pressing the SPACEBAR again.

Selecting in a Dialog Box Area

Sometimes you must move and select inside a dialog box area; for example, when you want to select text in a text box. The mouse and keyboard techniques for selecting inside a dialog box are different from those you use for moving between areas or for selecting areas. Selection techniques may vary depending on the kind of area you are working in: text box, list box, or a group of option buttons. The following sections explain how to move and select within the different kinds of dialog-box areas: text boxes, list boxes, option-button groups, check boxes, and command buttons.

Working with a Text Box

You can move and select text in a text box by using either a mouse
or the keyboard. You can quickly delete and revise information by
selecting text in a text box.

New name: [Text Editors|]
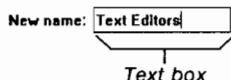
Text box

To select text in a text box by using a mouse, do the following:

▶ Drag the pointer across the text you want to select.

Moving and selecting in a text box are separate actions when you are
using the keyboard. Use the following keys to move in a text box:

To move	Press
Right or left on a line	DIRECTION keys
Left to the beginning of a line	HOME
Right to the end of a line	END

To select text in a text box by using the keyboard, do the following:

▶ Press and hold down SHIFT and press a DIRECTION key to extend
the selection.

Often a text box contains text that reflects a selection from your
application window; for example, a filename.

```
─                    Copy
Current directory is   C:\OS2\INTRO
   From  [ATHENS.BRK        ]
   To    [                  ]

   ( Copy )  ( Cancel )  ( Help )
```
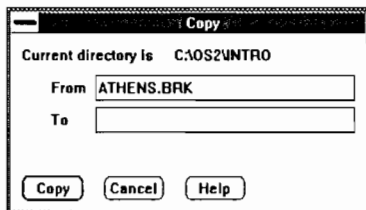
You can delete or edit this information.

To delete text in a text box by using the keyboard, follow these steps:

1. Move to the text box.
2. Select the text.
3. Type the new text.

To edit text in a text box by using the keyboard, do the following:

1. Move to the text box.
2. Select the text you want to change.
3. Type the new text.

Working with a List Box

As you move in a list box by using either a mouse or the keyboard, the selection cursor shows you which item or items you have selected.

Screen colors

Inactive Title Bar
Title Bar Text
Active Border
Inactive Border
Window Frame
Scroll Bars
Help Background
Help Text
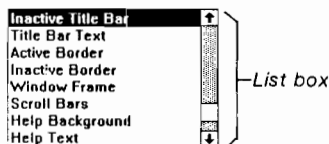
—List box

To make a selection by using a mouse, do the following:

▶ Click the item.

If you are using the keyboard, there are several keys you can use to move and select in a list box:

To move	Press
Up or down one item at a time	DIRECTION keys
Up to the first item in list	HOME

Down to the last item in list	END
Up to first item in the visible portion of list	PAGE UP
Down to last item in the visible portion of list	PAGE DOWN

Working with an Option Button

In Presentation Manager, you can select only one option button from a group of option buttons. Moving to a button selects it. Darkened options are selected.

Option buttons

┌─Sort by─────────┐
│ ● Name   │
│ ○ Extension   │
│ ○ Date and time │
│ ○ Size   │
└─────────────────┘
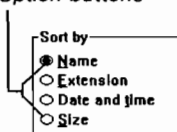
To select an option button by using a mouse, do the following:

▶ Click the option button.

To select an option button by using the keyboard, do the following:

▶ Press a DIRECTION key or, if the option name contains an underlined letter, press the underlined letter.

Working with a Check Box

In Presentation Manager, check boxes are used in a dialog box when you can select more than one option from a group of options. Check boxes that contain an "X" are selected.

Check boxes

┌────────────────────────────┐
│ ▬   File Options   │
├────────────────────────────┤
│ ⊠ Confirm on delete   │
│ ⊠ Confirm on subtree delete │
│ ⊠ Confirm on replace   │
│ ☐ Verify on copy   │
│   │
│ (Set) (Cancel) (Help)│
└────────────────────────────┘
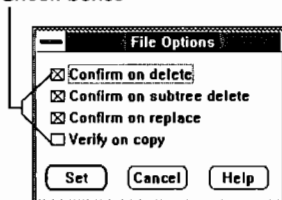
To select a check box by using a mouse, do the following:

▶ Click the check box.

If you are using the keyboard, you must first move to a check box and then select it. To move to and select a check box by using the keyboard, follow these steps:

1 Press TAB to move to the check box.
2 Press the SPACEBAR to select the check box.

To cancel the selection, press the SPACEBAR again.

Working with a Command Button

In Presentation Manager, command buttons carry out actions; for example, completing commands or displaying dialog boxes.

To choose a command button by using a mouse, do the following:

▶ Click the command button.

To choose a command button by using the keyboard, follow these steps:

1 Press TAB to move to the command-button area.

The selection cursor appears within the selected command button, and the button border changes color.

Selected command button

```
┌─────────────────────────────────────────────┐
│ ─  :  Printer Connections :                  │
├─────────────────────────────────────────────┤
│ Printer Name          Port Names             │
│ ┌──────────────┬─┐    ┌──────────┬─┐         │
│ │PRINTER1      │↑│    │COM1      │↑│         │
│ │PRINTER2      │ │    │COM2      │ │         │
│ │              │ │    │COM3      │ │         │
│ │              │ │    │LPT1      │ │         │
│ │              │ │    │LPT2      │ │         │
│ │              │↓│    │LPT3      │↓│         │
│ └──────────────┴─┘    └──────────┴─┘         │
│ ┌Printer──────────────┐  ┌Port──────┐        │
│ │(Names) (Drivers) (Setup)│ │(Comms) │       │
│ └─────────────────────┘  └──────────┘        │
│                                              │
│ [ Enter ]  [ Cancel ]  [ Help ]              │
└─────────────────────────────────────────────┘
```

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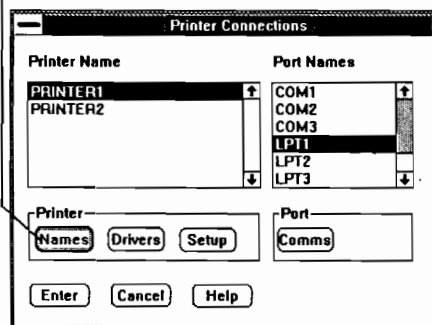
[2] To move to another command button, press a DIRECTION key.

[3] To choose the selected command button, press ENTER.

When the dialog box first appears, one command button has a dark border. This represents the option you are most likely to want (the default).

```
 ┌──────────────────────────────────────┐
 │ ▬           ░░░░░ Move ░░░░░           │
 ├──────────────────────────────────────┤
 │  Current directory Is    C:\OS2\INTRO │
 │                                        │
 │    From  ATHENS.BRK                    │
 │                                        │
 │    To    │                             │
 │                                        │
 │  ( Move )  ( Cancel )  ( Help )        │
 └──────────────────────────────────────┘
```
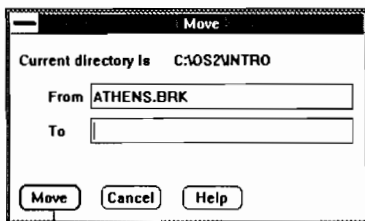
Default command button

To automatically choose the default command button, do the following:

▶ Press ENTER.

Note Even if you have moved to another area of the dialog box, pressing ENTER still carries out the default command.

Closing a Dialog Box

After you complete a dialog box and choose a command button, the dialog box closes and the command takes effect. To close the dialog box without completing the command, do the following:

▶ Choose the Cancel command button.

Some dialog boxes have System menus. You can use the Close command from this menu to close a dialog box that has no Cancel button.

You can cancel any dialog box by doing the following:

▶ Press ESC.

Moving a Window or an Icon

You can move a window or an icon to a different place on your screen by using a mouse or the keyboard.

To move a window by using a mouse, do the following:

1. Point to the title bar of the window you want to move.
2. Drag the title bar to move the window to its new location.

   Gray borders mark the window position.
3. After moving the window to its new location, release the mouse button.

To move an icon by using a mouse, do the following:

1. Point to the icon you want to move.
2. Drag the icon to the new location.
3. Release the mouse button.

To move a window or icon by using the keyboard, do the following:

1. Select the window or icon you want to move by using Task Manager or by pressing ALT+TAB.
2. Select the System menu by pressing ALT+SPACEBAR or SHIFT+ESC.
3. Press M to choose the Move command.

   Gray borders mark the window or icon position.
4. Use the DIRECTION keys to move the window or icon.

   An outline of the window moves as you press the DIRECTION keys.
5. After moving the window or icon to its new location, press ENTER.

Changing the Size of a Window

Windows can be arranged several ways on your screen. If you are using a mouse, you can directly manipulate each window border to change its size. If you are using the keyboard, the System-menu commands let you

change the window size and shape (you can also change window size by using the Maximize, Minimize, and Restore boxes, which are explained later in this chapter).

Minimize box

System-menu box　　*Maximize box*

```
━━  Start Programs   ↧ ↥
Program  Group            F1=Help
            Main Group
File System                          ↑
OS/2 full-screen command prompt
OS/2 windowed command prompt



                                     ↓
```

Window border
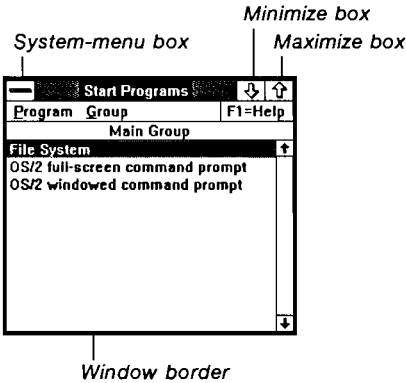
Note Some application windows are limited in the ways they can be sized. Some applications, such as Control Panel, have a fixed size. You can only shrink these application windows to icons and restore them.

```
━━           Control Panel       ↧
Preferences  Setup  Installation  Exit   F1=Help

  ┌Time─────┐      ┌Date─────┐
  │10:11:12 AM│    │10-26-88 │
  └─────────┘      └─────────┘
                                      ─Fixed window size
  ┌Cursor Blink┐   ┌Double-Click┐
  Slow    Fast     Slow    Fast
  ←▓▓ ▓▓→           ←▓▓ ▓▓→
                        TEST
```
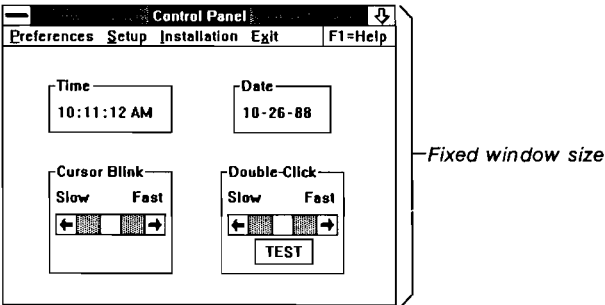
To change the size of a window by using a mouse, follow these steps:

1 Select the window you want to size by using Task Manager or by clicking in the window.

2 Point to a border or corner that you want to move.

The mouse pointer becomes a two-headed arrow.
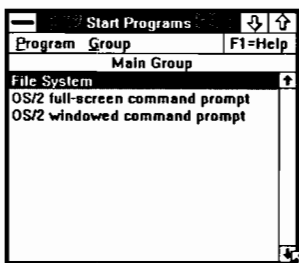
```
┌──────────────────────────────────┐
│ ▬    Start Programs      ⇩ ⇧     │
├──────────────────────────┬───────┤
│ Program  Group           │F1=Help│
├──────────────────────────┴───────┤
│            Main Group             │
├───────────────────────────────┬──┤
│ File System                   │ ↑│
│ OS/2 full-screen command prompt  │
│ OS/2 windowed command prompt      │
│                                   │
│                                   │
│                                   │
│                               ┌──┐│
│                               │↙↘││
└───────────────────────────────┴──┘
```
                 Two-headed arrow

3 Drag the corner or border until the window is the size you want.

4 Release the mouse button.

If you are using the keyboard, use the Size command to change the size of your windows by doing the following:

1 Select the active window by using Task Manager or by pressing ALT+TAB.

2 Select the System menu by pressing SHIFT+ESC.

3 Press S to choose the Size command.

4 Press one DIRECTION key to select the border you want to move.

5 Press the DIRECTION keys to move the border.

6 When you finish adjusting the border, press ENTER.

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Enlarging a Window or an Icon

You can enlarge a window to its maximum size by using a mouse:

▶ Select the window you want to enlarge by using Task Manager or by clicking in the window; then click the Maximize box.

Maximize box

```
━ ▒▒▒ Start Programs ▒▒▒  ⇩ ⇧
Program  Group              F1=Help
           Main Group
File System                        ↑
OS/2 full-screen command prompt
OS/2 windowed command prompt


                                   ↓
```
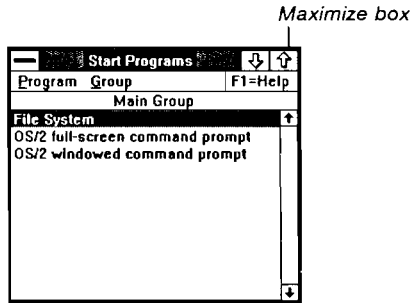
The Maximize box disappears and the Restore box takes its place.

Restore box

```
━                     ▒ Start Programs ▒              ⇩ 🔲
Program  Group                                      F1=Help
                      Main Group
File System                                               ↑
OS/2 full-screen command prompt
OS/2 windowed command prompt




                                                          ↓
```
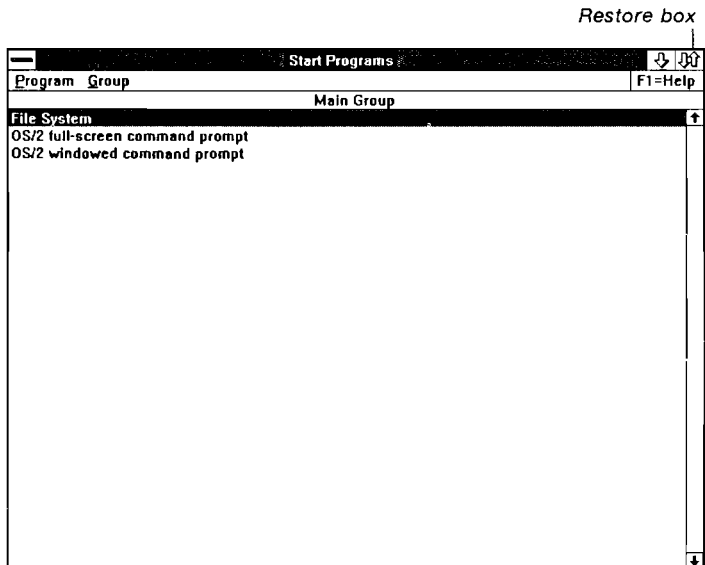
To enlarge an icon by using a mouse, follow these steps:

1 Click the icon you want to enlarge.

The System menu appears.

2 Click the Maximize command.

To enlarge a window or an icon by using the keyboard, do the following:

1 Select the window or icon you want to enlarge by using Task Manager or by pressing ALT+TAB.

2 Select the System menu by pressing SHIFT+ESC.

3 Press X to choose the Maximize command.

Shrinking a Window to an Icon

You can shrink a window to an icon when you finish working with it and want it available for later use. The application is still running in memory (represented by an icon), but it is not taking up space in your work area. You can select and move icons on your screen in the same way you select and move windows. When you want to work with your application in a window again, you can use the Maximize or Restore commands to enlarge it.

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To shrink a window by using a mouse, use the Minimize box in the upper-right corner of the window. Follow these steps:

☐1 Select the window you want to shrink by using Task Manager or by clicking in the window.

☐2 Click the Minimize box.

Minimize box

```
┌─────────────────────────────┬───┬───┐
│ ─    Task Manager           │ ⇩ │ ⇧ │
├──────────────────────┬──────┴───┴───┤
│ Task  Arrange  Shutdown │ F1=Help    │
├─────────────────────────┬────────────┤
│ DOS Command Prompt       │          ↑ │
│ Start Programs           │            │
│ Spooler Queue Manager    │            │
│                          │            │
│                          │            │
│                          │            │
│                          │          ↓ │
└──────────────────────────┴────────────┘
```

If you are using the keyboard, follow these steps to shrink your window to an icon:

☐1 Select the window you want to shrink by using Task Manager or by pressing ALT+TAB.

☐2 Select the System menu by pressing SHIFT+ESC.

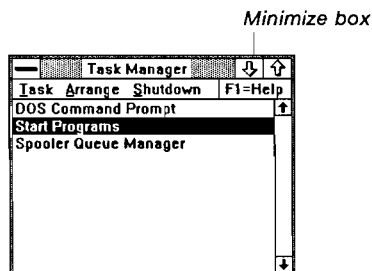☐3 Press N to choose the Minimize command.

Restoring a Window or an Icon

You can restore a window to its previous size after you have shrunk it to an icon or enlarged it to fill your screen. The Restore command returns a window to its original size, or to the size you last made it. The Restore command also returns your window to its original location on your screen.

If you are using a mouse, you can use the Restore box to return a window to its previous size by doing the following:

1 Select the window that you want to restore.

The Restore box is in the upper-right corner of the window.

Restore box

—	Start Programs	⇩ ⮕
Program Group		F1=Help
	Main Group	

File System
OS/2 full-screen command prompt
OS/2 windowed command prompt
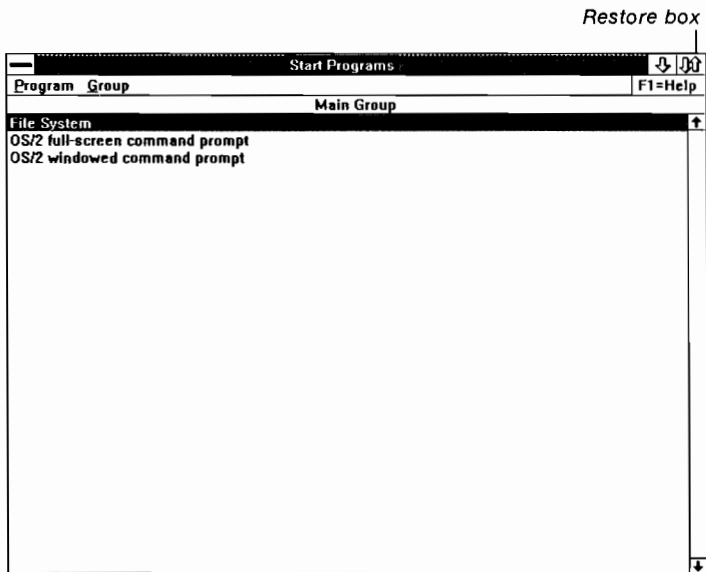
2 Click the Restore box.

To restore an icon to its previous size by using a mouse, do the following:

▶ Double-click the icon.

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If you are using the keyboard, follow these steps to restore a window or an icon:

[1] Select the window or icon that you want to restore by using Task Manager or by pressing ALT+TAB.

[2] Select the System menu by pressing SHIFT+ESC.

Restore	Alt+F5
Move	Alt+F7
Size	Alt+F8
Minimize	Alt+F9
Maximize	Alt+F10
Task Manager	Ctrl+Esc

[3] Press R to choose the Restore command.

Using a Scroll Bar

Some Presentation Manager application windows and dialog boxes have scroll bars that you can use to view information when it doesn't fit in one window.

Up scroll arrow

Task Manager	⬇ ⬆
Task Arrange Shutdown	F1=Help
DOS Command Prompt	↑
Start Programs	
Spooler Queue Manager	
File System	
Control Panel	
OS/2 System Editor	
Disk Information – CHKDSK	↓

—*Scroll box*

Down scroll arrow
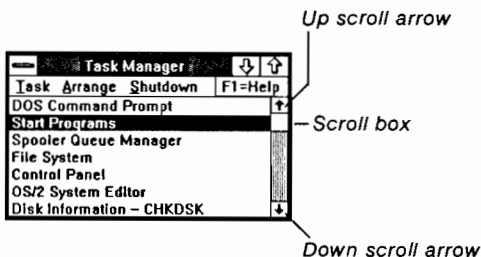
You can use a mouse to scroll a file or information in a dialog box by doing the following:

1 Drag the small box (the scroll box) in the scroll bar to the position in the scroll bar that corresponds to the general location where you want to work (beginning, middle, or end of the file or in a dialog box).

Country settings

| Norway |
| Portugal |
| Simplified Chinese |
| Spain |
| Sweden |
| Switzerland |
| Traditional Chinese |
| United Kingdom |
| U.S.A. |
| Other country |

―Scroll bar
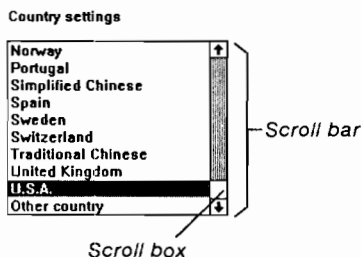
Scroll box

2 Release the mouse button.

The following list details how to scroll more precisely by using a mouse:

To scroll	Do this
One line	Click the scroll arrows at either end of the vertical scroll bar.
One screen	Click the scroll bar on either side of the vertical scroll box.
Continuously	Point to the scroll arrows at either end of the scroll bar and hold down the mouse button.

If you are using the keyboard, do the following to scroll after you have reached the last character or item in a window:

▶ Press the DIRECTION key with the arrow that points in the direction you want to scroll.

For example, to scroll right, go to the far-right character or item in a window and keep pressing the RIGHT key.

In addition, some applications allow you to scroll by the screenful (that is, as much as will fit in one window or dialog box at one time). The

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following list shows keys that you can use in some applications to move in a file or dialog box; not all applications use these keys in the same way, so try them out with each application:

To scroll	Press
Up one screen	PAGE UP
Down one screen	PAGE DOWN
Up to the window beginning	HOME
Down to the window end	END
Left one screen	CTRL+PAGE UP
Right one screen	CTRL+PAGE DOWN

Arranging Windows

Having several windows open at one time can make it difficult to see all of your applications while you work. You can use Task Manager to arrange your application windows on your screen. The commands on the Arrange menu help you do this.
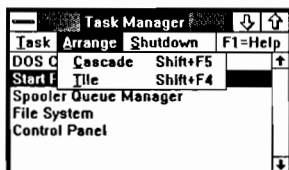
The Cascade command arranges application windows in an overlapping pattern so that the title bar of each application window remains visible.
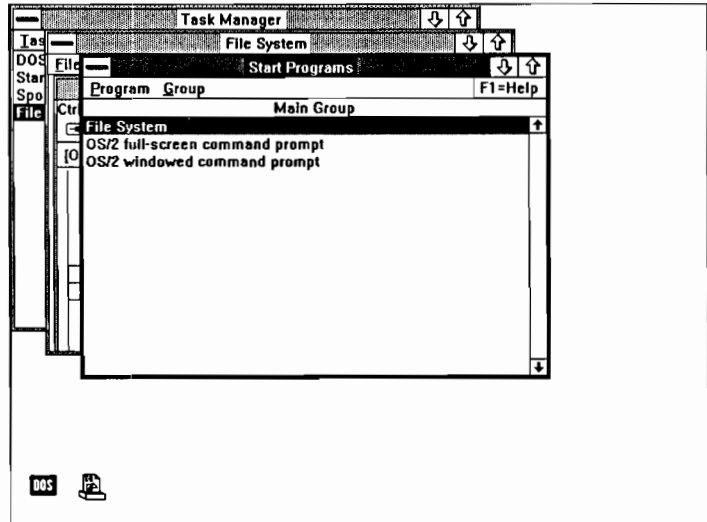
The Tile command sizes and arranges application windows side-by-side so that all windows are visible. The icon area at the bottom of your screen is reserved for icons.

```
┌─────── Start Programs ──────┬╨╥┐┌─────────── File System ─────────┬╨╥┐
│ Program  Group          F1=Help │ File  Options  Tree  Arrange  Window  Exit │
├──────── Main Group ─────────────┤├─────────────── F1=Help ──────────┤
│ File System                    ↑│├──────────── Directory Tree ──────────┤
│ OS/2 full-screen command prompt │ Ctrl+letter selects a drive.      │
│ OS/2 windowed command prompt    │ ⊞A   ⊞B   ⊟C                      │
│                                 │ [RALPH] C:\                       │
│                                 │ C:\                               │
│                                 │  ├─ OS2                           │
│                                 │     ├─ DLL                        │
│                                 │     ├─ INSTALL                    │
│                                 ├───────── Task Manager ──────┬╨╥┐  │
│                                 │ Task  Arrange  Shutdown  F1=Help │ │
│                                 │ DOS Command Prompt             ↑│ │
│                                 │ Start Programs                  │ │
│                                 │ Spooler Queue Manager           │ │
│                                 │ File System                     │ │
│                                ↓│                                ↓│ │
├──────────────────────────────────────────────────────────────────┤
│ ▨  ▨                                                               │
└────────────────────────────────────────────────────────────────────┘
```
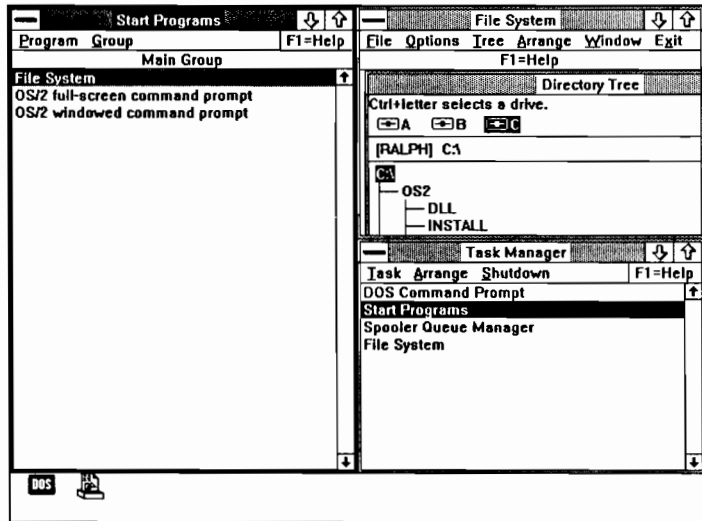
If you are using a mouse, follow these steps to use the commands on the Arrange menu:

1. Select Task Manager by double-clicking the Task Manager icon. If the icon is not visible, choose the Task Manager command from the System menu in the active window.

2. Click the Arrange menu on the menu bar.

3. Click either the Cascade command or the Tile command.

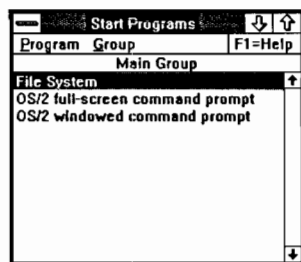If you are using the keyboard, follow these steps to use the Arrange-menu commands:

1. Select Task Manager by pressing CTRL+ESC or by choosing the Task Manager command from the System menu in the active window.
2. Press ALT, A to select the Arrange menu.
3. To choose the Cascade command, press C. To choose the Tile command, press T.

Using Help

Most Presentation Manager applications have online Help information. You can get Help information by using the keyboard or mouse.

Online Help information

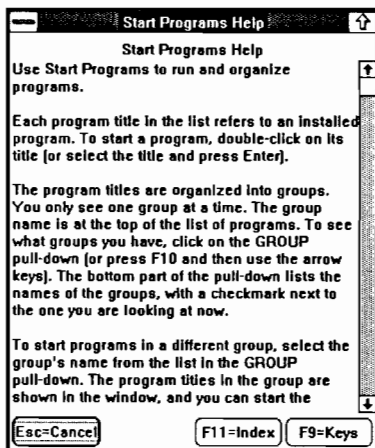If you are using a mouse, do the following to receive Help information:

▶ Click Help on the menu bar.

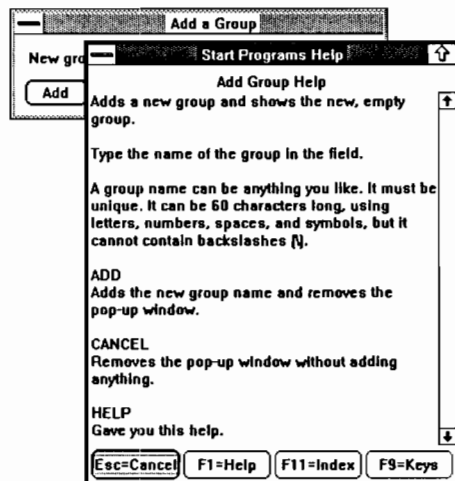If you are using the keyboard, do the following to receive Help information:

▶ Press F1.

The Help window appears in front of your application window.

```
┌──────────────────────────────────────────┐
│ ▬   ░░░░░░ Start Programs Help ░░░░░   ⬆  │
├──────────────────────────────────────────┤
│            Start Programs Help             │
│ Use Start Programs to run and organize  ┌┐│
│ programs.                               │⬆││
│                                         └┘│
│ Each program title in the list refers to an installed│
│ program. To start a program, double-click on its│
│ title (or select the title and press Enter).│
│                                            │
│ The program titles are organized into groups.│
│ You only see one group at a time. The group│
│ name is at the top of the list of programs. To see│
│ what groups you have, click on the GROUP │
│ pull-down (or press F10 and then use the arrow│
│ keys). The bottom part of the pull-down lists the│
│ names of the groups, with a checkmark next to│
│ the one you are looking at now.            │
│                                            │
│ To start programs in a different group, select the│
│ group's name from the list in the GROUP  │
│ pull-down. The program titles in the group are│
│ shown in the window, and you can start the┌┐│
│                                         │⬇││
│                                         └┘│
├──────────────────────────────────────────┤
│ [Esc=Cancel]        [F11=Index] [F9=Keys] │
└──────────────────────────────────────────┘
```
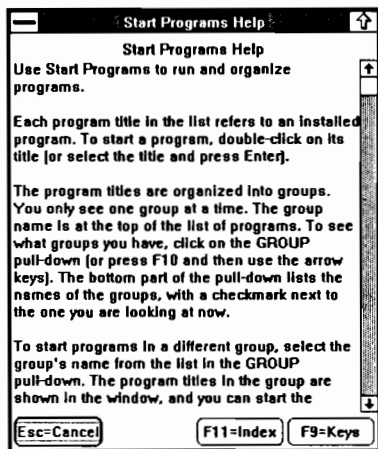
You can use Help at any time while you're working with your Presentation Manager application. Help information takes into account what you've selected in the application window. For example, if you've selected a menu, the Help window contains information on the commands in the menu; if you're working in a dialog box, the Help window contains information on the areas of the dialog box.

Using the Online Index

Help also contains an online index to all Help topics.

```
┌─────────────────────────────────────────┐
│ ▬    ⬚ Start Programs Help ⬚       ⬆ │
│          Start Programs Help              │
│ Use Start Programs to run and organize  ↑ │
│ programs.                                 │
│                                           │
│ Each program title in the list refers to an installed │
│ program. To start a program, double-click on its │
│ title (or select the title and press Enter). │
│                                           │
│ The program titles are organized into groups. │
│ You only see one group at a time. The group │
│ name is at the top of the list of programs. To see │
│ what groups you have, click on the GROUP │
│ pull-down (or press F10 and then use the arrow │
│ keys). The bottom part of the pull-down lists the │
│ names of the groups, with a checkmark next to │
│ the one you are looking at now. │
│                                           │
│ To start programs in a different group, select the │
│ group's name from the list in the GROUP │
│ pull-down. The program titles in the group are │
│ shown in the window, and you can start the  ↓ │
│                                           │
│ ┌Esc=Cancel┐       ┌F11=Index┐┌ F9=Keys ┐│
└─────────────────────────────────────────┘
                        │
                 Index button
```

To look at the Help index by using a mouse, do the following:

▶ Click the Index button in the Help window.

To look at the Help index by using the keyboard, do the following:

▶ Press F11, or press ALT+F1.

To get information on a particular Help-index topic by using a mouse, do the following:
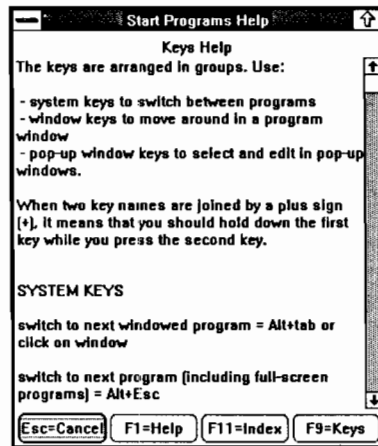
▶ Double-click the topic title you want.

To get information on a particular Help-index topic by using the keyboard, do the following:

1 Press the DIRECTION keys to select the topic title you want.

2 Press ENTER.

Keyboard Information

By looking at the Keys Help window, you can find out how different keys are used in your application.

```
┌──────────────────────────────────────────┐
│ ▬     ░░░ Start Programs Help ░░░      ⇧ │
│                  Keys Help                │
│ The keys are arranged in groups. Use:  ▲ │
│                                           │
│ - system keys to switch between programs  │
│ - window keys to move around in a program │
│ window                                    │
│ - pop-up window keys to select and edit in pop-up │
│ windows.                                  │
│                                           │
│ When two key names are joined by a plus sign │
│ (+), it means that you should hold down the first │
│ key while you press the second key.       │
│                                           │
│ SYSTEM KEYS                               │
│                                           │
│ switch to next windowed program = Alt+tab or │
│ click on window                           │
│                                           │
│ switch to next program (including full-screen │
│ programs) = Alt+Esc                      ▼ │
│ ┌────────┐┌───────┐┌─────────┐┌────────┐ │
│ │Esc=Cancel││F1=Help││F11=Index││F9=Keys│ │
│ └────────┘└───────┘└─────────┘└────────┘ │
└──────────────────────────────────────────┘
```

                                        Keys button

To open the Keys Help window by using a mouse, do the following:

▶ Click the Keys button in the Help window.

To open the Keys Help window by using the keyboard, do the following:

▶ Press F9.

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Closing the Help Window

The Help window remains open and in front of your application window. When you are finished with the Help window, you must close it.

To close the Help window by using a mouse, do the following:

▶ Click the Cancel button.

To close the Help window by using the keyboard, follow these steps:

1 Select the System menu.
2 Choose the Close command.

Or

▶ Press ESC.

Working with MS OS/2 Messages

When MS OS/2 encounters problems that require your action, it sends messages to your screen. There are several types of messages displayed, depending on the type of problem encountered. When you are working in Presentation Manager, most messages appear in dialog boxes. A Presentation Manager message tells you what caused the problem; for example, a directory path that cannot be found. These dialog boxes also contain Cancel and Help command buttons you can use to cancel the message or to get further information.

```
┌─────────────────────────────────────┐
│            File System               │
│                                      │
│ PMV1051: Cannot print. Make sure that the │
│ default printer is installed and connected │
│ correctly. Then retry.               │
│                                      │
│ (Cancel)    ( Help )                 │
└─────────────────────────────────────┘
```

Other problems, especially those caused by your computer system, cause messages to appear in a full screen. For example, if you forget to close a disk-drive door when you attempt to format a floppy disk, the following message may appear:

```
Session Title: Format diskette

SYS0039: The A: device is not ready.

        Return the error to the program
        End the program
        Retry the operation
```

The problem, identified by a message number, is shown along with the available options for correcting the problem.

To choose an option, do the following:

▶ Press the DIRECTION keys to select the action you want, and then press ENTER.

The following options are available:

Option	Action
Return the error to the program	Sends the error back to your application. If possible, you return to your application.
	Additional error messages may appear in your application.
End the program	Closes your application.
Retry the operation	Causes the application to try the action again.
	Choose this option when there is a problem you can correct, such as closing a disk-drive door.

You can use the message number to get additional information by using the **help** command in the MS OS/2 command interpreter (**cmd**). For

more information on the **help** command, see Chapter 8, "Using MS OS/2 Utilities," and the *Microsoft Operating System/2 Desktop Reference*.

Quitting Presentation Manager

Before you turn off your computer, you can use the Shutdown Now command in Task Manager to close all of your applications. The Shutdown Now command on the Shutdown menu also gives you a chance to save settings you have made in applications such as File System.

Follow these steps to quit Presentation Manager:

[1] Switch to Task Manager.

[2] Select the Shutdown menu and choose the Shutdown Now command.

The following dialog box appears:

```
┌──────────────────────────────────────────┐
│              Task Manager                  │
│  Are you sure that you want to end all your│
│  programs?                                 │
│   ( Yes )    ( No )    ( Help )            │
└──────────────────────────────────────────┘
```
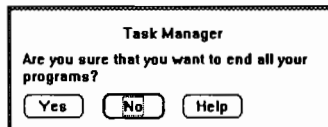
[3] Choose the Yes button if you want to quit Presentation Manager. Choose the No button to cancel the command and continue working in Presentation Manager.

[4] If you have open applications, additional dialog boxes may appear, asking if you want to save files or settings before closing each application. Respond to each dialog box.

After all applications are closed, a dialog box appears, informing you that all applications have ended.

[5] Turn off your computer or, to resume working with Presentation Manager, choose the Cancel button.

If you choose the Resume Task Manager command on the Shutdown menu, you return to Task Manager.

2 Running Applications with MS OS/2

Introduction

Presentation Manager includes two applications that let you take advantage of the multitasking ability of MS OS/2:

- *Start Programs* is used to start applications written for the graphical environment of Presentation Manager, as well as full-screen OS/2 applications. A full-screen OS/2 application is an application that runs in its own screen rather than as part of a Presentation Manager window. Some full-screen OS/2 applications are not designed to run in the graphical environment of Presentation Manager. Other full-screen OS/2 applications will run in windows in Presentation Manager.
- *Task Manager* is used for switching between applications. You can use Task Manager to switch to Presentation Manager applications, full-screen OS/2 applications, or one DOS application. All of your applications continue to run. You can switch between them without quitting or closing files. When you switch back to an application, you can continue your work where you left off.

This chapter explains how to use Start Programs to start applications. It also describes how to start a DOS application, and details other methods for starting applications. It explains how to switch between applications by using a mouse, the keyboard, and Task Manager. You will also find information on running full-screen OS/2 applications in Presentation Manager windows.

About Sessions

MS OS/2 organizes the tasks your computer performs into *sessions*: separate environments where your applications run. There are three basic kinds of sessions: Presentation Manager, DOS, and full-screen OS/2.

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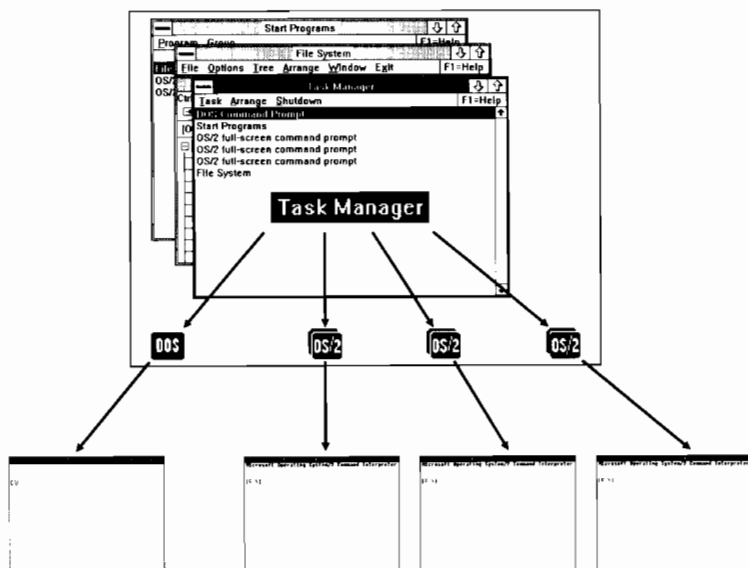
The Presentation Manager session is where applications written for the special Presentation Manager graphical environment run. Two Presentation Manager applications—Start Programs and Task Manager—are tools you use to organize and switch between all three kinds of sessions: Presentation Manager, DOS, and full-screen OS/2. Each Presentation Manager application you start is listed by name in Task Manager.

You can run one application written for DOS in the DOS session. This session is almost like having a separate 640-kilobyte computer that is running DOS. You can run only one application at a time, but Presentation Manager lets you switch to the DOS session any time you like by using Task Manager. The DOS session starts when you start Presentation Manager and is represented on the Presentation Manager screen by the DOS icon. The DOS session is listed in Task Manager as the DOS Command Prompt.

You run an OS/2 application in the full-screen OS/2 session. These
are applications that are not designed for the Presentation Manager
graphical environment. You can start up to 12 separate full-screen
OS/2 sessions, running one application in each session. In a full-
screen OS/2 session, an application runs in a full screen; you cannot
see the Presentation Manager session. When you switch back to the
Presentation Manager session, you see each full-screen OS/2 session
represented by an icon. Each session is listed by name in Task
Manager.

Some full-screen OS/2 applications can also run in windows, sharing
the screen with Presentation Manager applications. For example, the
MS OS/2 command interpreter, **cmd**, can run in a window. When a
full-screen OS/2 application is running in a window, it is running in the
Presentation Manager session. Many of the advantages of a Presenta-
tion Manager application are available through the System-menu
commands. When you are working with a full-screen application in a
window, however, the commands, mouse, and keyboard work exactly
as they did in a full screen.

Starting an Application with Start Programs

The Presentation Manager Start Programs application starts your appli-
cations. It starts automatically when you turn on your computer or
press CTRL+ALT+DEL. It shares the screen with the DOS session,
Spooler Queue Manager, and Task Manager icons.

```
┌──────────────────────────────────────────────────────────┐
│                                                            │
│                                                            │
│         ┌────────────────────────────────────┐            │
│         │ ━  ▓▓▓▓ Start Programs ▓▓▓▓  ⇩ ⇧ │            │
│         │ Program  Group            F1=Help  │            │
│         │          Main Group                │            │
│         │ File System                      ↑ │            │
│         │ OS/2 full-screen command prompt    │            │
│         │ OS/2 windowed command prompt       │            │
│         │                                    │            │
│         │                                    │            │
│         │                                    │            │
│         │                                    │            │
│         │                                  ↓ │            │
│         └────────────────────────────────────┘            │
│                                                            │
│   ┌───┐  ┌──┐                                     ┌──┐     │
│   │DOS│  │🖫 │                                     │⊟ │     │
│   └───┘  └──┘                                     └──┘     │
└──────────────────────────────────────────────────────────┘
     │                                                 │
  DOS icon                              Task Manager icon
```

Applications you can start are listed in Start Programs. Start Programs
divides applications into groups. The Main Group is the first group that
appears when you start Presentation Manager.

To start an application from Start Programs by using a mouse, do the
following:

▶ Double-click the application name.

If you are using the keyboard, do the following to start an application:

1 Press the DIRECTION keys to select the application you want to start.
2 Press ENTER.

You can also use the Start command on the Program menu to start an application by using either a mouse or the keyboard by doing the following:

1 Select the application in the Start Programs window.
2 Select the Program menu and choose the Start command.

After you start an application from Start Programs, the Start Programs window remains open. You can use the Minimize On Run command on the Program menu to automatically shrink Start Programs to an icon each time you start an application.

To use the Minimize On Run command, do the following:

▶ Select the Program menu and choose the Minimize On Run command.

Depending on the kind of application you start from Start Programs, your screen will look different. If you start a Presentation Manager application, like File System or Control Panel, the application runs in a window in front of other application windows.

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```
┌─────────────────────────────────────── File System ───────────── ⇩ ⇧ ┐
│ File  Options  Tree  Arrange  Window  Exit                    F1=Help │
├─────────────────────── Directory Tree ──────────────────────────────┤
│ Ctrl+letter selects a drive.                                          │
│  ⊞A   ⊞B   ⊟C                                                         │
│ ┌───────────────────────────────────────────────────────────────┐   │
│ │ [RALPH]  C:\                                                    │   │
│ ├───────────────────────────────────────────────────────────────┤   │
│ │ C:\                                                            │   │
│ │ ├─ OS2                                                         │   │
│ │ │   ├─ DLL                                                     │   │
│ │ │   ├─ INSTALL                                                 │   │
│ │ │   ├─ INTRO                                                   │   │
│ │ │   └─ SYSTEM                                                  │   │
│ │ ├─ REPORTS                                                     │   │
│ │ └─ SPOOL                                                       │   │
│ │                                                                │   │
│ │                                                                │   │
│ └───────────────────────────────────────────────────────────────┘   │
│                                                                       │
│                                                                       │
│ ▣DOS  🖳                                                          ⊟  │
└───────────────────────────────────────────────────────────────────────┘
```
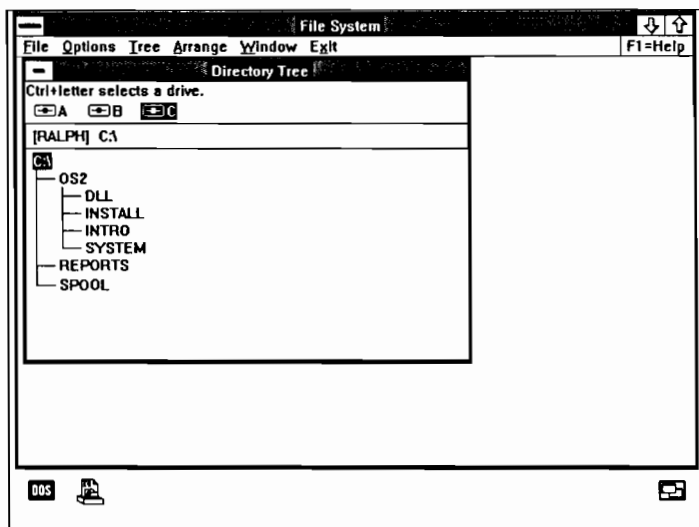
If the program you start is a full-screen OS/2 application—for example,
OS/2 Full-Screen Command Prompt—the Presentation Manager screen
disappears and the application screen takes its place.

```
 OS/2      Ctrl+Esc = Task Manager                    Type HELP = help
Microsoft Operating System/2 Command Interpreter Version 1.10


[C:\]




```

If the application is a full-screen OS/2 application that runs in a window, like Format Diskette, the application runs in a window in front of other Presentation Manager application windows.

```
┌─────────────────────────────────────────────────────────────┐
│ ─     ▓▓▓▓▓▓▓▓▓▓▓▓▓▓ File System ▓▓▓▓▓▓▓▓▓▓▓▓      ⇩ ⇧ │
│ File  Options  Tree  Arrange  Window  Exit              F1=Help │
│ ┌────────────────── Directory Tree ▓▓▓▓▓▓▓▓▓┐           │
│ Ctrl+letter selects a drive.                            │
│ ⊞A ┌──── ▓▓▓▓▓▓▓▓▓ Format diskette ▓▓▓▓▓▓ ⇩ ⇧│      │
│ [RALPH│Insert a new diskette in drive A:         ▲│      │
│ ▓▓▓│and press Enter when ready._              │      │
│ ─ OS:│                                          │      │
│      │                                          │      │
│      │                                          │      │
│ ─ REI│                                          │      │
│ └─ SP│                                          ▼│      │
│      │←│▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓│→│      │
│ ┌─────────────────────────────────────────────────────────┐ │
│ │ DOS  🖳                                            ▣     │ │
│ └─────────────────────────────────────────────────────────┘ │
└─────────────────────────────────────────────────────────────┘
```
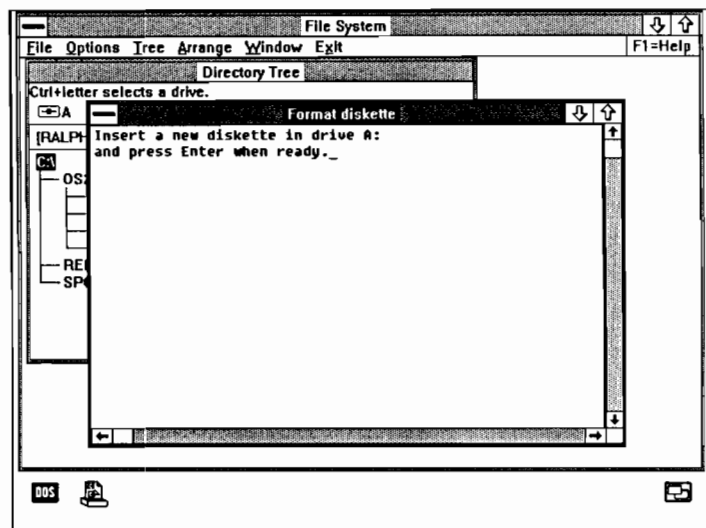
This window, however, is somewhat different from other Presentation Manager application windows. It has a System menu and a title bar, but no menu bar. For more detailed information on working with full-screen OS/2 applications running in windows, see "Working with a Full-Screen OS/2 Application in a Window," later in this chapter.

Changing Program Groups

Applications in Start Programs are divided into *program groups*. The first group you see when you start Presentation Manager is the Main Group.

```
┌─────────────────────────────────────────┐
│ ═══  ░░░░░░ Start Programs ░░░░░░  │ ⇩ │ ⇧ │
├────────────────────────────┬──────────────┤
│ Program   Group            │  F1=Help     │
├────────────────────────────┴──────────────┤
│              Main Group                    │
├────────────────────────────────────────┬──┤
│ File System                             │ ↑│
│ OS/2 full-screen command prompt         │  │
│ OS/2 windowed command prompt            │  │
│                                         │  │
│                                         │  │
│                                         │  │
│                                         │  │
│                                         │  │
│                                         │ ↓│
└─────────────────────────────────────────┴──┘
```
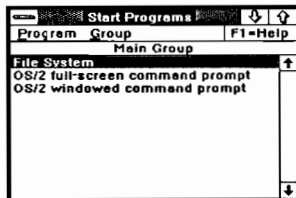
The following list describes the Main Group programs:

- File System is a Presentation Manager application that helps you view and organize your files and directories. You can also use File System to start applications. You'll find more details on using File System in Chapter 3, "Using File System."

- OS/2 Full-Screen Command Prompt is the Start Programs listing for the MS OS/2 command interpreter, **cmd**, running as a full-screen application. When you start this application, the Presentation Manager screen disappears and you see the MS OS/2 command prompt.

- OS/2 Windowed Command Prompt is **cmd** running in a window with Presentation Manager applications. Running **cmd** this way allows you to view your other applications. You can also shrink the **cmd** window to an icon.

In addition to applications in the Main Group, Start Programs contains a Utility Programs group with the following entries:

- Control Panel is a Presentation Manager application you use to set up printers, change country information and screen colors, and set system information such as the date and time.

- Disk Information—CHKDSK is an MS OS/2 utility program that you use to check for errors and available storage space on your disks.

■ Format Diskette is an MS OS/2 utility program that you can use to format floppy disks in drive A.

■ OS/2 System Editor is a text editor you can use to create and change text files.

To change program groups in Start Programs, do the following:

[1] Select the Group menu in Start Programs.

```
┌─────────────────────────────────────┐
│ ▬  ░░░░ Start Programs ░░░░  🔽 🔼    │
├──────────┬────────────┬──────────────┤
│ Program  │ Group      │ F1=Help      │
├──────────┼────────────┴──────────────┤
│          │ Add...                     │
│ File Syste│ Delete...                 │
│ OS/2 full-s│ Rename...                │
│ OS/2 wind │✓1. Main Group             │
│          │ 2. Utility Programs        │
│          │ 3. Demonstration Programs  │
│          │                            │
│          │                            │
│          │                           ↓│
└──────────┴────────────────────────────┘
```
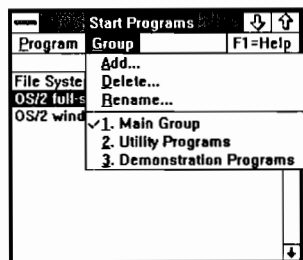
The different program groups are listed at the bottom of the menu. A check mark appears next to the current group.

[2] Choose the group you want.

You can add new groups or change the programs in a group by using the commands on both the Program and the Group menus. For information on adding new groups, see "Creating a Program Group," later in this chapter. For information on changing programs in Start Programs groups, see "Copying an Application in Start Programs," later in this chapter.

Starting an Application from File System

In Presentation Manager, you can choose among several ways to start applications. In addition to starting an application by using Start Programs, you can also start an application by opening an application file

in File System. Application files are called *program files* and usually have the filename extension .EXE, .COM, or .CMD. In File System directory windows, you can recognize program files by their file icons.

```
┌──────────────────────────────────────────────────┐
│ ▬          C:\OS2\INTRO\*.*                        │
├──────────────────────────────────────────────────┤
│ 9 file(s) [109 kilobytes] of 9.  8678 kilobytes free. │
│ ▣ OLDGAMES                                         │
│ ☐ ACLOCK.EXE                                       │
│ ▢ APLTREE.BRK                                      │
│ ▢ ATHENS.BRK                                       │
│ ▢ ATLANTIS.BRK                                     │
│ ☐ BRICKS.EXE                                       │
│ ▢ PARIS.BRK                                        │
│ ▢ SEATTLE.BRK                                      │
│ ▢ TOKYO.BRK                                        │
│                                                    │
│                                                    │
│                                                    │
└──────────────────────────────────────────────────┘
```
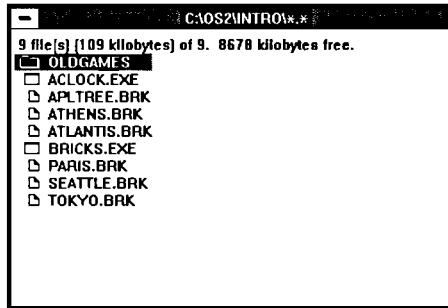
Note The information in this section is intended to be an introduction to File System. For more complete information on starting applications from File System, see Chapter 3, "Using File System."

You can start an application from File System by using either a mouse or the keyboard.

To start an application by using a mouse, do the following:

[1] Switch to Start Programs and select the Main Group.

[2] Start File System.

[3] In the Directory Tree window, double-click the name of the directory that contains the application you want to start.

60

```
┌────────────────────────────────────────────────────────────┬─────┐
│ ▬                          File System                       │ ⇩ ⇧ │
├──────────────────────────────────────────────────────────────┼─────┤
│ File  Options  Tree  Arrange  Window  Exit                   │F1=Help│
│ ┌──────────────────── Directory Tree ─────────────────┐      │
│ │Ctrl+letter selects a drive.                          │      │
│ │ ┌─────────────── C:\OS2\INTRO\*.* ──────────────┐    │      │
│ │ │ 9 file(s) (109 kilobytes) of 9.  8672 kilobytes free. │ │
│ │ │ ▭ OLDGAMES                                     │    │      │
│ │ │ ☐ ACLOCK.EXE                                   │    │      │
│ │ │ ▯ APLTREE.BRK                                  │    │      │
│ │ │ ▯ ATHENS.BRK                                   │    │      │
│ │ │ ▯ ATLANTIS.BRK                                 │    │      │
│ │ │ ☐ BRICKS.EXE                                   │    │      │
│ │ │ ▯ PARIS.BRK                                    │    │      │
│ │ │ ▯ SEATTLE.BRK                                  │    │      │
│ │ │ ▯ TOKYO.BRK                                    │    │      │
│ │ │                                                │    │      │
│ │ └────────────────────────────────────────────────┘    │      │
│ └────────────────────────────────────────────────────┘      │
│                                                              │
└──────────────────────────────────────────────────────────────┘
```
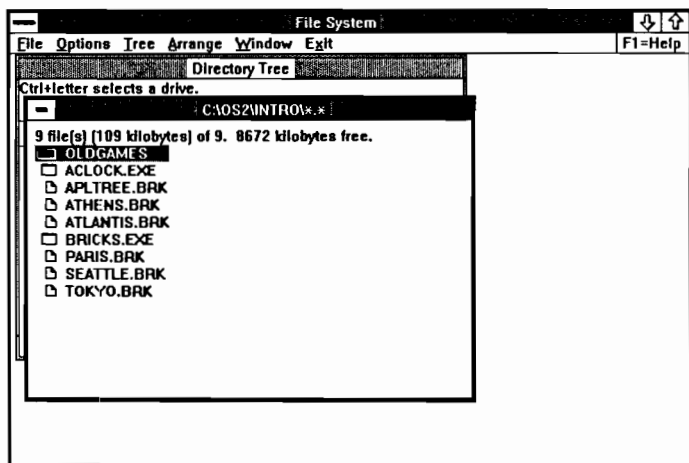
④ Double-click the application filename.

If you are using the keyboard, follow these steps to start an application from File System:

① Switch to Start Programs and select the Main Group.

② Start File System.

③ In the Directory Tree window, press the DIRECTION keys to select the name of the directory that contains the application you want to start, and then press ENTER.

The directory window opens.

④ In the directory window, press the DIRECTION keys to select the program file for the application you want to start, and then press ENTER.

Starting an Application from the MS OS/2 Command Interpreter

You can also start applications from the MS OS/2 command interpreter, **cmd**.

To start an application from the MS OS/2 command interpreter, do the following:

1. Select the Main Group in Start Programs and start either OS/2 Full-Screen Command Prompt or OS/2 Windowed Command Prompt.
2. At the MS OS/2 prompt, type the name of the application you want to start and any command-line arguments, and then press ENTER.

Your screen will look different if your application runs in a window or if it runs in a full screen. If you start a full-screen OS/2 application, you see only the application screen. If you start a Presentation Manager application or a full-screen OS/2 application that runs in a window, the application window appears in front of other application windows.

When you complete your work with a particular application, you can quit the application. You can also quit the MS OS/2 command interpreter.

To quit the MS OS/2 command interpreter, follow these steps:

▶ At the MS OS/2 prompt, type **exit** and press ENTER.

Or

▶ If you are running the MS OS/2 command interpreter in a window, you can quit by closing the window.

If you are using a mouse, follow this step to close the MS OS/2 command-interpreter window:

▶ Double-click the System menu.

If you are using the keyboard, follow these steps to close the MS OS/2 command-interpreter window:

1 Press SHIFT+ESC to select the System menu.

2 Choose the Close command.

Starting a DOS Application

In Presentation Manager, you start DOS applications differently from MS OS/2 applications. You can run one DOS application at a time in a special environment called the DOS session, almost as if the application is on a separate computer running DOS. You can switch between the DOS session and other MS OS/2 applications, but the multitasking capabilities of MS OS/2 are not available in the DOS session. The DOS session is represented by an icon at the bottom of your screen when you start Presentation Manager.

DOS

To run a DOS application, you must first switch to the DOS session.

To switch to the DOS session by using a mouse, do the following:

▶ Double-click the DOS icon.

If you are using the keyboard or if the DOS icon is not visible on your screen, use Task Manager to switch to the DOS session. Follow these steps:

1 Press CTRL+ESC.

The Task Manager window appears.

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```
┌──────────────────────────────────┐
│ ▬      Task Manager      🔽 🔼 │
├──────────────────────────┬───────┤
│ Task  Arrange  Shutdown  │F1=Help│
├──────────────────────────┴─────┬─┤
│ DOS Command Prompt             │↑│
│ Start Programs                 │ │
│ Spooler Queue Manager          │ │
│                                │ │
│                                │ │
│                                │ │
│                                │ │
│                                │↓│
└────────────────────────────────┴─┘
```
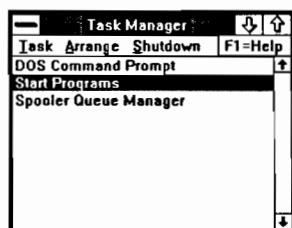
② Choose the DOS Command Prompt entry from the list of
applications.

To start a DOS application, do the following:

▶ At the DOS prompt, type the command that starts the application
you want and any command-line arguments, and then press ENTER.

You can run only one DOS application at a time in the DOS session;
however, you can switch back to Presentation Manager and use other
MS OS/2 applications without quitting your DOS application. Details
on switching between applications are provided in the following section.

Note You may experience problems with some DOS graphics applica-
tions when you switch between the DOS session and another session.
In some DOS graphics applications the screen may not be restored
correctly when you return to it from another session. If this occurs,
close the DOS graphics application before switching to another session.

Switching Between Applications

After you start more than one application, you need to switch between
applications and choose the application you want to work with. There
are several ways to accomplish this depending on whether you use a
mouse or the keyboard.

Switching Between Visible Applications

You can use a mouse to switch quickly between applications that are visible in your Presentation Manager screen by doing the following:

▶ To switch to an application running in a window, click the application window.

Or

▶ To switch to an application running as an icon, double-click the icon.

To switch between applications by using the keyboard, do the following:

▶ Press ALT+TAB.
Repeat this step until you reach the application you want.

Switching Between Icons

If you switch to an application that is running as an icon, the application title and the System menu appear. To work with this application, you must first restore it.

To restore an icon, do the following:

▶ Choose the Restore command.

You can also use the following keyboard technique to switch between Presentation Manager applications and full-screen OS/2 applications or the DOS session without choosing the Restore command:

▶ Press ALT+ESC.
Repeat this step until you reach the application you want.

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Switching Between Applications by Using Task Manager

Another way to switch between applications is to use Task Manager, which helps you keep track of your applications and can be used to switch quickly between them. Task Manager starts when you start Presentation Manager; it is always running. Its icon is in the lower-right portion of your screen. You can switch to Task Manager from the DOS session or from a full-screen OS/2 application, as well as from Presentation Manager.

Task Manager icon

To switch to Task Manager from its icon by using a mouse, do the following:

▶ Double-click the Task Manager icon.

To switch to Task Manager by using the keyboard, do the following:

▶ Press CTRL+ESC.

```
─  ⠒ Task Manager    ⇩ ⇧
 Task  Arrange  Shutdown   F1=Help
DOS Command Prompt                ↑
Start Programs
Spooler Queue Manager
File System
Control Panel
Format diskette
OS/2 full-screen command prompt

                                  ↓
```
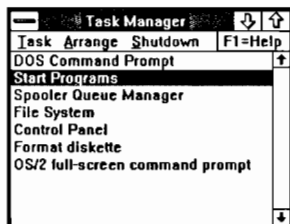
You can also switch to Task Manager by using the Task Manager command on the System menu by doing the following:

▶ Select the System menu and choose the Task Manager command. The applications you are currently running are listed in Task Manager.

To switch to another application by using a mouse, do the following:

▶ Double-click the application name.

To switch to another application by using the keyboard, do the following:

▶ Press the DIRECTION keys to select the name of the application you want to switch to, and then press ENTER.

You can use the Task Manager Switch To command on the Task menu to switch to the selected application by doing the following:

1. In the Task Manager window, select the application you want.
2. Select the Task menu and choose the Switch To command.

You can automatically shrink Task Manager to an icon after switching to an application by doing the following:

▶ Select the Task menu and choose the Minimize After Use command.

Adding an Application to Start Programs

To make starting applications easier and faster, you can add them to Start Programs with the Add command. This command stores the name of your application, its path, and any command arguments in Start Programs.

To add an application to Start Programs, follow these steps:

1. Switch to Start Programs.
2. Select the program group you want to add your application to.
3. Select the Program menu and choose the Add command.

The Add Program dialog box appears.

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```
┌──────────────── Add Program ──────────────┐
│ Required                                   │
│   Program title . . . .  [│           ]    │
│   Path and file name     [            ]    │
│                                            │
│ Optional                                   │
│   Parameters  . . . . .  [            ]    │
│   Working directory . .  [            ]    │
│                                            │
│  ( Add )    ( Cancel )    ( Help )         │
└────────────────────────────────────────────┘
```
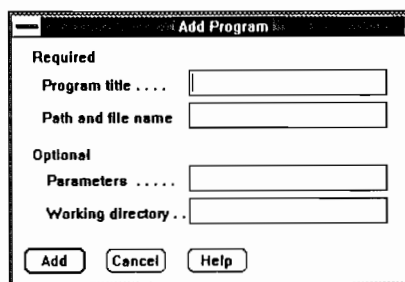
4 Type the requested information in the dialog box.

For more information on completing the Add Program dialog box, see the list following this procedure.

5 To add the application, choose the Add button.

The following list describes each area of the Add Program dialog box:

- In the Program Title text box, you type the title of your application. This is the name that will appear in the Start Programs list. You can use any name you want, as long as it is unique within the program group.

- In the Path and File Name text box, you type the disk-drive letter and a colon (:); the directory path, separating each directory in a directory path with a backslash (\); and the filename of your application.

  For example, to add the XCOPY.EXE application file on drive C in your OS2 directory, you would type the following:

  c:\os2\xcopy.exe

- In the Parameters text box, you type any command arguments; for example, a filename or an option. Type these arguments just as you would if you were typing the command at the MS OS/2 prompt. Argument information is optional but some applications do not run correctly without this information.

  To display a dialog box requesting argument information each time you start the application, type a question mark (?) in the Parameters text box.

- In the Working Directory text box, you type the location of the directory you want to work in with your application; for example, the directory that contains particular text files for a text-editing program.

Changing Application Information in Start Programs

You can change any application information used by Start Programs by using the Change command on the Program menu. For example, you may want to change the working directory for the application or provide an additional argument, such as a filename. For full-screen OS/2 applications, you can use the Change command to change whether an application runs in a window or in a full screen.

To use the Change command to change program information, follow these steps:

1. Switch to Start Programs.
2. Select the application you want from its program group.
3. Select the Program menu and choose the Change command.

   The Change Program Information dialog box appears, displaying the current program information.

```
┌────────────────────────────────────────────────┐
│ ▬        ▓▓▓ Change Program Information ▓▓       │
├──────────────────────────────────────────────── │
│  Required                                        │
│    Program title ....  │Format diskette      │   │
│    Path and file name  │C:\OS2\FORMAT.COM    │   │
│  Optional                                        │
│    Parameters .....    │A:                   │   │
│    Working directory . │\                    │   │
│   ┌─Program type──────────────────────────────┐  │
│   │  ○ Presentation Manager                    │  │
│   │  ● Other                                   │  │
│   └────────────────────────────────────────────┘ │
│  (Change)  (Cancel)  ( Help )                    │
└──────────────────────────────────────────────────┘
```


Computer Museum

4. Move to the dialog-box area you want to change and type the correct information.
5. Choose the Change button.

The last section in the dialog box, Program Type, lists two options: Presentation Manager and Other. Presentation Manager can determine what the application type is—Presentation Manager or Other—and whether the application should be run in a window or in a full screen. Presentation Manager applications always run in windows.

Some applications run in a window or in a full screen, depending on what is specified by the application.

To change the default for running your application full-screen or in a window, do the following:

[1] Switch to Start Programs.

[2] Select the application you want to change (it cannot be a Presentation Manager application).

[3] Select the Program menu and choose the Change command.

The Change Program Information dialog box appears. The Other option in the Program Type section is selected.

```
┌─Program type──────────────────────────────┐
│ ○ Presentation Manager                     │
│ ● Other                                     │
└─────────────────────────────────────────────┘
```

[4] Choose the Change button.

The How to Run the Program dialog box appears.

```
┌─────────────────────────────────────────────┐
│ ━      How to Run the Program               │
│─────────────────────────────────────────────│
│ Format diskette is not an OS/2 Presentation  │
│ Manager program. How do you want to run it?  │
│                                              │
│       ○ Let the program decide               │
│       ○ Run the program full-screen          │
│       ● Run the program in a text window     │
│                                              │
│   ☒ Close the window when the program ends   │
│  ( Enter )  ( Cancel )  ( Help )             │
└─────────────────────────────────────────────┘
```
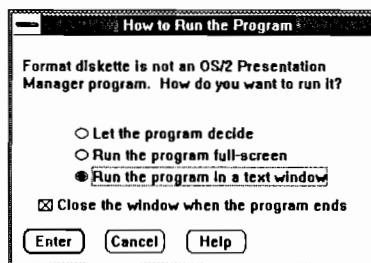
[5] If you want your application to run in a full screen, select the Run the Program Full-Screen option. If you want your full-screen OS/2 application to run in a window, select the Run the Program in a Text Window option. If you want your application to determine whether it runs in a window or in a full screen, select the Let the Program Decide option.

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If you select the Run the Program in a Text Window option, you
can also turn on the Close the Window When the Program Ends
check box. This automatically closes the window when you quit
your application.

6 Choose the Enter button.

Copying an Application in Start Programs

You can copy applications to different groups in Start Programs by
using the Copy command on the Program menu. You may want to
include a frequently used application, such as the MS OS/2 command
interpreter (**cmd**), in more than one program group.

To copy an application to a different group, follow these steps:

1 Switch to Start Programs.

2 Select the Group menu and choose the application group.

3 Select the application name in Start Programs.

4 Select the Program menu and choose the Copy command.

The Copy Program dialog box appears.

```
┌──────────── Copy Program ────────────┐
│ Copy OS/2 windowed command            │
│ prompt to (select a group):           │
│ ┌───────────────────────────────┐↑   │
│ │Demonstration Programs         │    │
│ │Main Group                     │    │
│ │Utility Programs               │    │
│ │                               │↓   │
│ └───────────────────────────────┘    │
│ Optional                              │
│ Change Title to: [            ]       │
│ ( Copy )  (Cancel)  ( Help )          │
└───────────────────────────────────────┘
```

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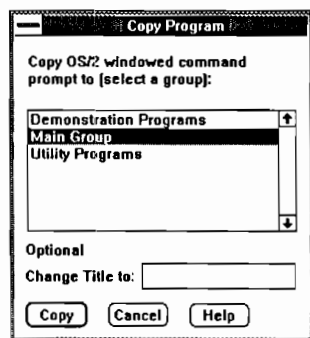
The name of the application you selected in Start Programs appears at the top of the dialog box.

5 Select the group to which you want to copy the application.

6 To change the application name in its new group, type the new name in the Change Title To text box.

7 Choose the Copy button.

Deleting an Application from Start Programs

You can delete any application listed in Start Programs by using the Delete command on the Program menu.

To delete an application, do the following:

1 Switch to Start Programs.

2 Select the Group menu and choose the application group.

3 Select the application name in Start Programs.

4 Select the Program menu and choose the Delete command.

The following dialog box appears:

```
            Start Programs
  Are you sure that you want to delete
  Bricks?
   [ Yes ]    [  No  ]    [ Help ]
```
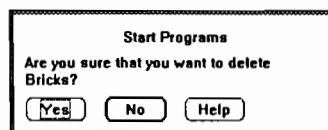
5 Choose the Yes button to delete the application. Choose the No button to return to Start Programs. Choose the Help button for information on the Delete command.

Creating a Program Group

You can create a new program group in Start Programs by using the Add command on the Group menu. The program-group name you create appears in the list on the Group menu.

To add a program group to Start Programs, follow these steps:

☐1 Switch to Start Programs.

☐2 Select the Group menu and choose the Add command.

The Add a Group dialog box appears.

```
┌─────────────────────────────────────────┐
│ ━           Add a Group                  │
├─────────────────────────────────────────┤
│ New group name [                       ] │
│  (  Add  )  (Cancel)  (  Help  )         │
└─────────────────────────────────────────┘
```
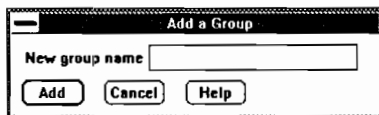
☐3 Type the name of the group in the New Group Name text box.

☐4 Choose the Add button.

After you add a new group, Start Programs automatically switches to
that group. You add applications by using the Add command on the
Program menu. You can also switch to another group and copy applica-
tions to the new group by using the Copy command. For more informa-
tion on copying applications from one group to another, see "Copying
an Application in Start Programs," earlier in this chapter.

Renaming a Program Group

You can change the name of a program group in Start Programs by
using the Rename command on the Group menu.

To rename a program group, follow these steps:

☐1 Switch to Start Programs.

☐2 Select the Group menu and choose the Rename command.

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The Rename Group dialog box appears.

```
┌─────────────────────────────────┐
│ ━    ▒▒▒ Rename Group ▒▒▒        │
│ ┌─────────────────────────────┐ │
│ Select a group to rename        │
│ ┌───────────────────────────┬─┐ │
│ │Demonstration Programs     │↑│ │
│ │Main Group                 │ │ │
│ │Utility Programs           │ │ │
│ │                           │ │ │
│ │                           │ │ │
│ │                           │↓│ │
│ └───────────────────────────┴─┘ │
│ New name: ┌─────────────────┐    │
│           └─────────────────┘    │
│ ┌────────┐ ┌────────┐ ┌──────┐   │
│ │ Rename │ │ Cancel │ │ Help │   │
│ └────────┘ └────────┘ └──────┘   │
└─────────────────────────────────┘
```
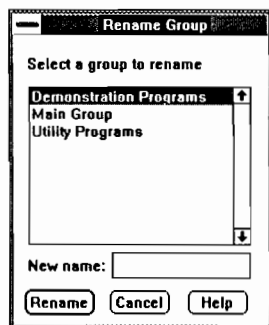
3 Select the group name you want to change.

4 Type the new name in the New Name text box.

5 Choose the Rename button.

Deleting a Program Group

You can remove a program-group name from the group listing by using the Delete command on the Group menu. However, you must first remove all applications from the group by using the Delete command on the Program menu.

To delete a group name, do the following:

1 Switch to Start Programs.

2 Select the Group menu and choose the Delete command.

The Delete Group dialog box appears.

```
┌─────────────────────────────┐
│ ▬    Delete Group           │
├─────────────────────────────┤
│ Select a group to delete.   │
│ ┌─────────────────────────┐ │
│ │Demonstration Programs │▲│ │
│ │Main Group               │ │
│ │Utility Programs         │ │
│ │                       │▼│ │
│ └─────────────────────────┘ │
│ (Delete) (Cancel)  ( Help ) │
└─────────────────────────────┘
```
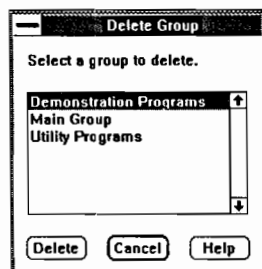
③ Select the name of the group you want to delete (the group should not contain any applications).

④ Choose the Delete button.

Working with a Full-Screen OS/2 Application in a Window

Many full-screen OS/2 applications can run in windows even though they are not specifically designed as Presentation Manager applications. Running an application in a window gives you many of the advantages of a Presentation Manager application: you can size the window, you can use a mouse to switch to the application, and you have easy access to other applications.

System-menu box

```
─────────────────── OS/2 windowed command prompt ──────────── ⇩ ⇧
 OS/2     Ctrl+Esc = Task Manager                    Type HELP = help  ↑
Microsoft Operating System/2 Command Interpreter Version 1.10

[C:\]_




─┤                                                                ├→
```
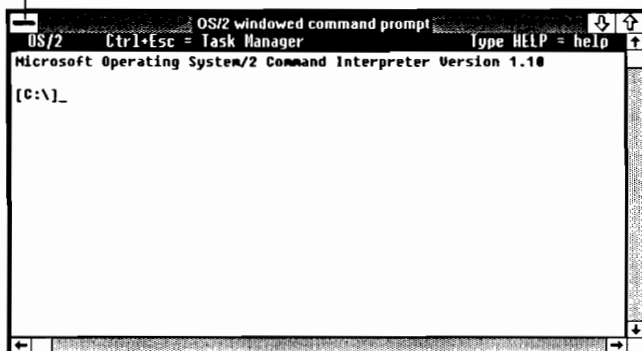
If you are using a mouse, you can select the System menu from an MS OS/2 application, by doing the following:

▶ Click the System-menu box.

To select the System menu by using the keyboard, do the following:

▶ Press ALT or press SHIFT+ESC.

```
┌────────────────────────────────────────────────┐
│ ⚊⃝┊        ⌐ OS/2 windowed command prompt        ⬇ ⬆│
│ ┌──────────────────────────┐sk Manager    Type H⬆│
│ │ Restore                  │                     ▓│
│ │ Move                     │                     ▓│
│ │ Size                     │                     ▓│
│ │ Minimize                 │                     ▓│
│ │ Maximize                 │                     ▓│
│ ├──────────────────────────┤                     ▓│
│ │ Close                    │                     ▓│
│ ├──────────────────────────┤                     ▓│
│ │ Task Manager    Ctrl+Esc │                     ▓│
│ ├──────────────────────────┤                      │
│ │ Help...                  │                      │
│ │ Next Window     Alt+Esc  │                      │
│ │ Small Font               │                      │
│ │ Scroll                   │                      │
│ └──────────────────────────┘                      │
│                                                   │
│                                                  ⬇│
│ ⬅ ▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓ ➡│
└────────────────────────────────────────────────┘
```
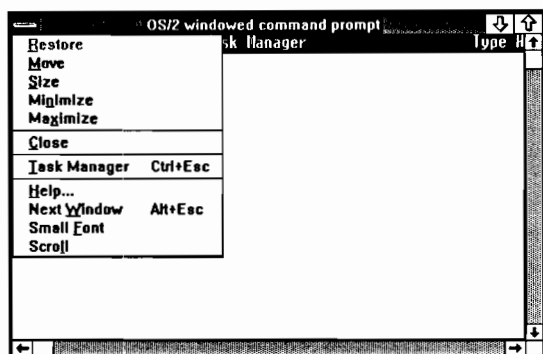
The System menu of a full-screen OS/2 application running in a window has additional commands on it to help you use Presentation Manager features. These commands are described in the following sections.

Using Help

There is Help information available on running an application in a window; however, you get Help information on a full-screen OS/2 application running in a window in a different way than you do on a regular Presentation Manager application.

To get Help information on running a full-screen OS/2 application in a window, do the following:

▶ Select the System menu and choose the Help command.

The Help window appears, containing general information on working with full-screen OS/2 applications running in windows.

```
┌─────────────────────────────────────────┐
│ ═  ░░ Windowed Application Help ░░░  ⇧   │
├─────────────────────────────────────────┤
│             About Text Windows            │
│ A text window is a window type that is  ↑ │
│ intermediate between OS/2 full-screen and OS/2│
│ Presentation Manager.                     │
│                                           │
│ The program is usually unaware of the text│
│ window around it. Nearly all the keys work as they│
│ would if the program were running full-screen,│
│ but there are a few exceptions:           │
│                                           │
│ - Shift+Esc or Alt show the system menu  │
│ - Ctrl+Esc switches to the Task Manager  │
│ - Alt+Esc switches to the next program   │
│ - Alt+tab switches to the next windowed  │
│ program.                                  │
│                                           │
│ When the system menu is visible, select these│
│ choices:                                  │
│                                           │
│ Restore takes a minimized or maximized window│
│ back to its previous size.              ↓ │
├─────────────────────────────────────────┤
│ ┌──────────┐        ┌─────────┐┌────────┐│
│ │Esc=Cancel│        │F11=Index││F9=Keys ││
│ └──────────┘        └─────────┘└────────┘│
└─────────────────────────────────────────┘
```

The Help window itself is a Presentation Manager application and works the same way that other Presentation Manager windows work.

When you finish looking at the Help information, you can use a mouse to close the Help window by doing the following:

▶ Click the Cancel button.

To close the Help window by using the keyboard, do the following:

▶ Press ESC.

Moving Between Applications

You can switch to another application from a full-screen OS/2 application running in a window the same way you switch from an application running in Presentation Manager: by clicking in another window, by

pressing ALT+ESC or ALT+TAB to move to the next application, or by pressing CTRL+ESC to switch to Task Manager. In addition, the Next Window command on the System menu lets you switch to another application.

To switch to another application by using the Next Window command, do the following:

▶ Select the System menu and choose the Next Window command.

Reducing the Size of the Text Font

You can reduce the size of the text characters displayed by a full-screen OS/2 application running in a window by using the Small Font command on the System menu. Reducing the size of the characters allows more information to appear inside a window.

To reduce the size of text characters by using the Small Font command, do the following:

▶ Select the System menu and choose the Small Font command.

The characters in the window become smaller. In the System menu, the Small Font command is replaced by the Large Font command.
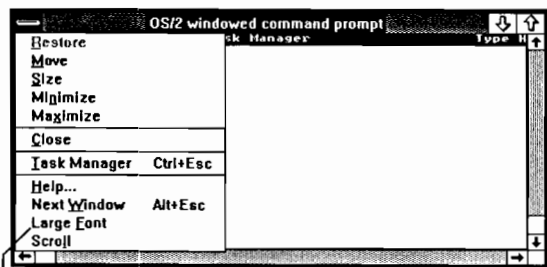
Large Font command

To restore the text characters to their original size, do the following:

▶ Select the System menu and choose the Large Font command.

Scrolling a Window

When you are running a full-screen OS/2 application in a window, you may not be able to see all of the information in one application screen. You can scroll the contents of the window to see more information by using either the scroll bars or the Scroll command on the System menu.

To scroll a window by using a mouse, do the following:

▶ Click the scroll bars at the side or bottom of the window.

Vertical scroll bar

```
┌──────────────────── OS/2 windowed command prompt ──────────┬──┬──┐
│ ▬                                                          │ ⇩│ ⇧│
│   OS/2     Ctrl+Esc = Task Manager          Type HELP = help│  │ ▮│
│ [C:\OS2\INTRO]dir                                           │  │
│                                                             │
│ The volume label in drive C is OS2.                         │
│ Directory of C:\OS2\INTRO                                   │
│                                                             │
│ .            <DIR>       10-31-88    2:32p                  │
│ ..           <DIR>       10-31-88    2:32p                  │
│ ACLOCK   EXE    11264    10-27-88    6:53a                  │
│ APLTREE  BRK      738    10-26-88    1:53p                  │
│ ATHENS   BRK     6878    10-28-88    8:49a                  │
│ ATLANTIS BRK    17098    10-26-88    1:54p                  │
│ BRICKS   EXE    36864    11-02-88    4:25p                  │
│ PARIS    BRK     8818    10-28-88    8:36a                  │
│ SEATTLE  BRK    21578    10-26-88    1:55p                  │
│ TOKYO    BRK     9058    10-26-88    1:55p                  │
│        10 File(s)  11245568 bytes free                      │
│                                                             │
│ [C:\] _                                                     │ ▮│
│                                                             ├──┤
│ ←                                                       → │
└─────────────────────────────────────────────────────────────┘
```

Horizontal scroll bar

If you are using the keyboard, you can use the Scroll command on the System menu to scroll the contents of the window. Do the following:

[1] Select the System menu and choose the Scroll command.

A check mark appears next to the Scroll command on the System menu and the title bar of the window changes to show that the Scroll command is in effect.

Scroll command turned on

```
┌─────────────────── Scrolling: OS/2 windowed command prompt ────────── ⬇ ⬆
│    OS/2      Ctrl•Esc = Task Manager                      Type HELP = help ⬆
│ACLOCK    EXE    11264  10-27-88    6:53a
│APLTREE   BRK      730  10-26-88    1:53p
│ATHENS    BRK     6878  10-28-88    8:49a
│ATLANTIS  BRK    17098  10-26-88    1:54p
│BRICKS    EXE    36864  11-02-88    4:25p
│PARIS     BRK     8818  10-28-88    8:36a
│SEATTLE   BRK    21578  10-26-88    1:55p
│TOKYO     BRK     9058  10-26-88    1:55p
│       10 File(s)  11245568 bytes free
│
│[C:\]_
│                                                                          ⬇
└← ──────────────────────────────────────────────────────────────────→
```
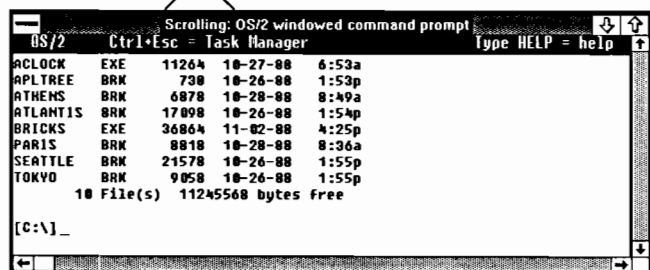
[2] Press the DIRECTION keys to scroll the window.

[3] After you complete scrolling, select the System menu and choose the Scroll command again.

The following list details how to use the DIRECTION keys to scroll through the contents of an application window:

To scroll	Press
Up one line	UP
Down one line	DOWN
Right one character	RIGHT
Left one character	LEFT

Sizing a Window

You change the size of full-screen OS/2 application windows in much the same way you change the size of Presentation Manager application windows: by using a mouse or choosing the Size, Minimize, Maximize, or Restore commands on the System menu. These commands work a little differently, however, in full-screen OS/2 application windows.

To size a full-screen OS/2 application window by using a mouse, follow these steps:

1. Point to the border or corner that you want to move.

   The mouse pointer becomes a two-headed arrow.

2. Drag the corner or border until the window is the size you want.

3. Release the mouse button.

To size a full-screen OS/2 application window by using the keyboard, follow these steps:

1. Select the System menu and choose the Size command.

2. Press one DIRECTION key to choose the border you want to move (make sure that you have not chosen the Scroll command; you cannot size the window if the Scroll command is in effect).

3. Press the DIRECTION keys to move the border until the window is the size you want.

4. Press ENTER.

If you choose the Small Font command, the window becomes smaller and you are limited in how much you can size it. The same amount of information is displayed but the character size is reduced.

You can enlarge a full-screen OS/2 application window to a maximum size that is smaller than a Presentation Manager window. The icon area remains visible on your screen. If you choose the Small Font command, the maximum size of the window is reduced.

When you enlarge a full-screen OS/2 application window to its maximum size, the scroll bars disappear.

To enlarge a full-screen OS/2 application window to its maximum size by using a mouse, do the following:

▶ Click the Maximize box.

To enlarge a full-screen OS/2 application window to its maximum size by using the keyboard, do the following:

▶ Select the System menu and choose the Maximize command.

You can shrink a full-screen OS/2 application window to an icon by using a mouse. Do the following:

▶ Click the Minimize box.

To shrink a full-screen OS/2 application window to an icon by using the keyboard, do the following:

▶ Select the System menu and choose the Minimize command.

When you reduce to an icon a full-screen OS/2 application that is running in a window, the following icon appears at the bottom of your screen:

▣

Quitting an Application

When you finish working in a full-screen OS/2 application that is running in a window, you can quit your application and save your work.

To quit your application and close the window, do the following:

▶ Select the System menu and choose the Close command.

You can also use the Task Manager Close command to quit an application and close the window by doing the following:

1 Switch to Task Manager and select the application you want to close.
2 Select the Task menu and choose the Close command.

Presentation Manager can automatically close an application window when you quit the application. For more information on this option,

see "Changing Application Information in Start Programs," earlier in
this chapter.

Quitting a Presentation Manager Application

You can quit a Presentation Manager application by using the applica-
tion Exit or Close command or by closing the application in Task
Manager. Be sure you save any changes in an application file before
using the Close command.

To use Task Manager to close a Presentation Manager application, do
the following:

1. Switch to Task Manager and select the application you want to
   close.
2. Select the Task menu and choose the Close command.

3 Using File System

Introduction

This chapter explains File System, a Presentation Manager application that lets you quickly look at and organize your directories and files. From the Directory Tree window you can see the overall directory structure, as well as the contents of individual directories. You use File System commands to copy, delete, or rename your files.

Starting File System

File System is a Presentation Manager application and is started from Start Programs.

To start File System, do the following:

1 Move to Start Programs.
2 Select the Group menu and choose Main Group.
3 Choose File System.

File System appears on your screen with the Directory Tree window displayed in the work area. The Directory Tree window lets you see the layout of your directories and subdirectories on any disk drive. From this window, you can open windows to look at files and subdirectories in individual directories. You can select different drives in order to look at their directory structure. You can open as many directory windows as you like; however, there is only one Directory Tree window.

```
┌──────────────────────────────────────────────────────────────┐
│ ▬                          File System                 ⬇ ⬆   │
│ File  Options  Tree  Arrange  Window  Exit         F1=Help    │
│ ┌───────────────────── Directory Tree ─────────────────────┐ │
│ │ Ctrl+letter selects a drive.                             │ │
│ │ ⊞A   ⊞B   ⊟C                                             │ │
│ │ [RALPH] C:\                                              │ │
│ │ ▣                                                        │ │
│ │ └─ OS2                                                   │ │
│ │    ├─ DLL                                                │ │
│ │    ├─ INSTALL                                            │ │
│ │    ├─ INTRO                                              │ │
│ │    └─ SYSTEM                                             │ │
│ │ ├─ REPORTS                                               │ │
│ │ └─ SPOOL                                                 │ │
│ │                                                          │ │
│ └──────────────────────────────────────────────────────────┘ │
│                                                                │
└──────────────────────────────────────────────────────────────┘
```
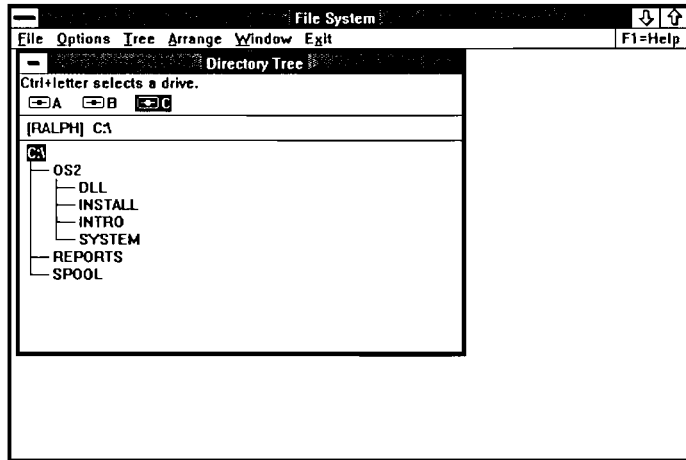
The MS OS/2 multilevel file system resembles a tree. The tree begins with the *root directory*—the name of the first directory on the disk drive. The root directory is created when you format a disk. It appears as a backslash (\).

Root directory

```
┌──────────────────────────────────────────────────────────┐
│ ▬                    Directory Tree                      │
│ Ctrl+letter selects a drive.                             │
│ ⊞A   ⊞B   ⊟C                                             │
│ [RALPH] C:\                                              │
│ ▣                                                        │
│ └─ OS2                                                   │
│    ├─ DLL                                                │
│    ├─ INSTALL                                            │
│    ├─ INTRO                                              │
│    └─ SYSTEM                                             │
│ ├─ REPORTS                                               │
│ └─ SPOOL                                                 │
│                                                          │
└──────────────────────────────────────────────────────────┘
```
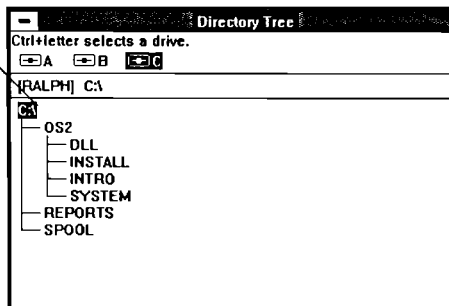
The branches of the tree are the directories you create from the root directory. Each directory can contain more directories.

The Directory Tree window contains the following parts:

- The *System-menu box* is in the upper-left corner of the Directory Tree window. You use its commands to move and size the window and to move to other windows in File System.
- The *drive icons* represent disk drives on your computer. A selection cursor shows the current disk drive. A drive letter and a colon (:) represent disk drives. The current drive is listed at the top of the Directory Tree window.
- The *volume label* is a name that identifies your disk; it appears in square brackets ([ ]). You see this information only if you give your disk a volume label.
- The *directory path* shows the selected directory in the Directory Tree window.
- The *current directory* is the directory marked by the selection cursor in the Directory Tree window. File System commands affect this directory.
- Directories are listed in alphabetical order beneath the root directory (\). All directories are joined to the root directory by a vertical line. If there are any subdirectories below a directory, they appear beneath the directory, connected by a vertical line.
- *Scroll bars* appear if there are more directories and subdirectories than will fit in one Directory Tree window.

The Directory Tree window resembles an application window in Presentation Manager. You can size and move windows within the File System work area; however, you cannot shrink windows to icons.

Changing Disk Drives

When you start File System, the Directory Tree window shows the directory structure on the current disk drive—the disk drive you are working on. The selected disk-drive icon represents the current disk drive.

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```
┌─────────────────────────────────────────┐
│ ▬        Directory Tree                  │
├─────────────────────────────────────────┤
│ Ctrl+letter selects a drive.             │
│ ⊕A    ⊕B   ⊕C                           │
├─────────────────────────────────────────┤
│ [RALPH] C:\                              │
├──────────────────────┬──────────────────┤
│ C:\                  │                  │
│  ├─ OS2              │                  │
│  │   ├─ DLL         │                  │
│  │   ├─ INSTALL     │                  │
│  │   ├─ INTRO       │                  │
│  │   └─ SYSTEM      │                  │
│  ├─ REPORTS         │                  │
│  └─ SPOOL           │                  │
│                      │                  │
│                      │                  │
└──────────────────────┴──────────────────┘
```
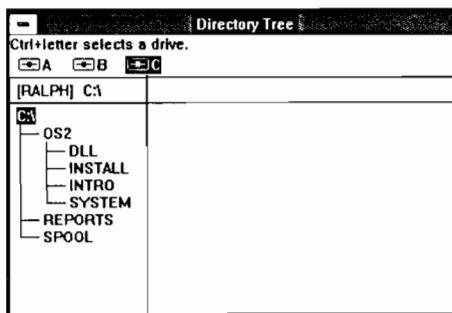
Disk-drive icon

To look at directories on other disk drives, you must select another disk drive, which then becomes the current disk drive.

To select a disk drive by using a mouse, do the following:

► Click the disk-drive icon.

To select a disk drive by using the keyboard, do the following:

► Press and hold down CTRL, and then press the disk-drive letter.

Changing Directories in the Directory Tree Window

In the Directory Tree window, the selection cursor shows the current directory.

Current directory

```
┌─────────────────────────────────────────┐
│ ─    ▒▒▒▒▒▒▒▒▒ Directory Tree ▒▒▒▒▒▒▒▒▒   │
├─────────────────────────────────────────┤
│ Ctrl+letter selects a drive.             │
│ ⊕A   ⊕B   ⊟C                             │
├─────────────────────────────────────────┤
│ |RALPH| C:\                              │
├─────────────────────────────────────────┤
│ ▓                                         │
│ └─ OS2                                    │
│     ├─ DLL                                │
│     ├─ INSTALL                            │
│     ├─ INTRO                              │
│     └─ SYSTEM                             │
│   ├─ REPORTS                              │
│   └─ SPOOL                                │
│                                           │
│                                           │
└─────────────────────────────────────────┘
```
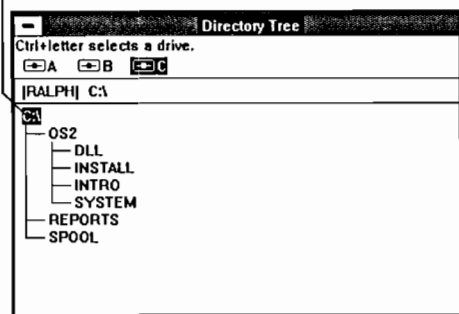
You can only select one directory at a time in this window. To change to a different directory, you move the selection cursor.

To move the selection cursor by using a mouse, do the following:

▶ Click the directory name.

To select a directory by using the keyboard, do the following:

▶ Press UP or DOWN.

The following list describes several additional keys you can use to move and select in the Directory Tree window.

To select	Press
Root directory	CTRL+HOME
Last directory listed	CTRL+END
First subdirectory of a selected directory, if one exists	RIGHT
Next directory level up from a selected directory, if one exists	LEFT

Directory one window up from a selected directory	PAGE UP
Directory one window down from a selected directory	PAGE DOWN
Directory name or filename	Initial letter

Opening a Directory Window

The Directory Tree window shows you the overall structure of your directories. To see the contents of a directory, you must open a directory window.

Directory windows open in front of the Directory Tree window. All the files and any subdirectories are displayed. The disk drive and directory path appear at the top of the window in the title bar. The directory path shows the location of the directory in relation to the root directory. Directory names are separated by backslashes (\).

To open a directory window by using a mouse, do the following:

▶ In the Directory Tree window, double-click the directory name.

To open a directory window by using the keyboard, do the following:

1 In the Directory Tree window, press the UP or DOWN key to select the directory you want to open.

2 Press ENTER.

Subdirectory icon

Path

```
┌────────────────────────────────────────────────┐
│ ■          C:\OS2\INTRO\*.*                      │
├────────────────────────────────────────────────┤
│ 9 file(s) (109 kilobytes) of 9. 8672 kilobytes free. │
│ ▭ OLDGAMES                                       │
│ ▭ ACLOCK.EXE                                     │
│ ▷ APLTREE.BRK                                    │
│ ▯ ATHENS.BRK                                     │
│ ▯ ATLANTIS.BRK                                   │
│ ▭ BRICKS.EXE                                     │
│ ▯ PARIS.BRK                                      │
│ ▯ SEATTLE.BRK                                    │
│ ▯ TOKYO.BRK                                      │
│                                                  │
│                                                  │
└────────────────────────────────────────────────┘
```

Data-file icon
Program-file icon
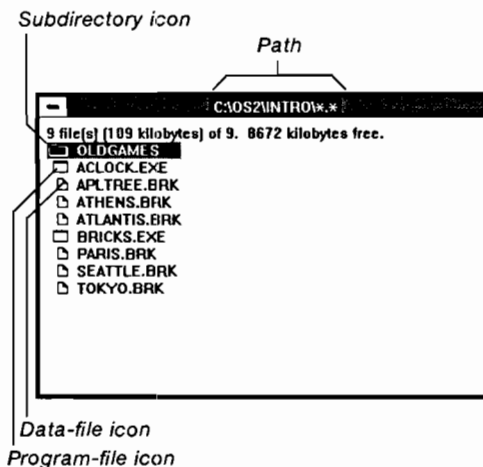
Files with a .EXE, .COM, or .CMD filename extension are distinguished by the following icon, which indicates that they are program files:

▭

Other files, such as text files, are distinguished by the following icon (these files are called *data files* in Presentation Manager):

▯

Subdirectories appear at the top of the list of files and are distinguished by the following subdirectory icon:

▭

Selecting in a Directory Window

In directory windows, you must select directories and files before you can use most File System commands.

Selecting a Directory or File

To select a directory or file by using a mouse, do the following:

▶ Click the directory name or filename.

The following list explains how to select directories or files by using the keyboard:

To select	Press
Directory name or filename	UP or DOWN
Last directory or file listed	END
First directory or file listed	HOME
File or directory one directory window up	PAGE UP
File or directory one directory window down	PAGE DOWN
Directory name or filename	Initial letter

Note The PAGE UP and PAGE DOWN keys scroll the directory window up or down one window. The selection cursor remains in the same relative position in the window; for example, if the first file in the window is selected before you press the key, the first file in the new directory listing is selected. If you size the directory window so that it displays all files and directories, the selection cursor does not move when you press PAGE UP and PAGE DOWN.

Extending a Selection

In directory windows, you can select more than one item at a time. This is called extending a selection. For example, you can select several files and copy them to another directory.

```
┌─────────────────────────────────────────┐
│ [■]        C:\OS2\INTRO\*.*              │
├─────────────────────────────────────────┤
│ Selected: 3 file[s] [24 kilobytes] from 9.│
│ ▭ OLDGAMES                               │
│ ▭ ACLOCK.EXE                             │
│ ▐ APLTREE.BRK                            │
│ ▐ ATHENS.BRK                             │
│ ▐ ATLANTIS.BRK                           │
│ ▭ BRICKS.EXE                             │
│ ▭ PARIS.BRK                              │
│ ▭ SEATTLE.BRK                            │
│ ▭ TOKYO.BRK                              │
│                                          │
│                                          │
│                                          │
└─────────────────────────────────────────┘
```
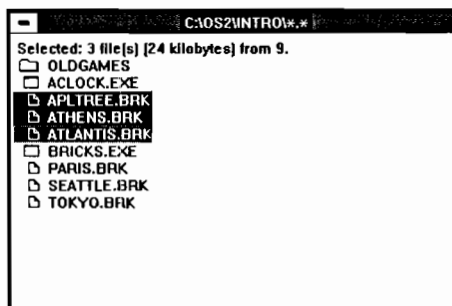
To extend a selection by using a mouse, follow these steps:

1. Select the first item you want in the group by clicking the filename or directory name.
2. Press and hold down SHIFT and click the last item in the group.

To extend a selection by using the keyboard, follow these steps:

1. Press the DIRECTION keys to move to the first item you want to select.
2. Press SHIFT+DIRECTION key(s) to extend your selection to the remaining items in the group.

Selecting a Scattered Group of Items

You can also extend your selection to include scattered files or
directories.

```
┌─────────────────────────────────────────┐
│ [-]               C:\OS2\INTRO\*.*        │
├─────────────────────────────────────────┤
│ Selected: 3 file(s) (38 kilobytes) from 9.│
│  ☐ OLDGAMES                               │
│  ☐ ACLOCK.EXE                             │
│  ▓ APLTREE.BRK                            │
│  ☐ ATHENS.BRK                             │
│  ▓ ATLANTIS.BRK                           │
│  ☐ BRICKS.EXE                             │
│  ☐ PARIS.BRK                              │
│  ▓ SEATTLE.BRK                            │
│  ☐ TOKYO.BRK                              │
│                                           │
│                                           │
│                                           │
└─────────────────────────────────────────┘
```

To select a scattered group of items by using a mouse, do the following:

▶ Press and hold down CTRL and click each item.

To select a scattered group of items by using the keyboard, follow these
steps:

[1] Press the DIRECTION keys to move to each item.

[2] Press the SPACEBAR to select an item.

Selecting All Files

To select all files in a directory window, follow these steps:

[1] Select the File menu.

[2] Choose the Select All command.

Canceling a Selection

To cancel a selection by using a mouse, do the following:

▶ Click the item and press the SPACEBAR.

To cancel a selection by using the keyboard, follow these steps:

1 Press the DIRECTION keys to move to the item.
2 Press the SPACEBAR.

You can also use two File System commands on the File menu to cancel selections in directory windows: Deselect All and Undo Selection.

File	
Open	Enter
Print	Shift+Print Screen
Associate...	
Move...	
Copy...	
Delete...	Delete
Rename...	
Change attributes...	
Create directory...	
Select all	Ctrl+/
Deselect all	Ctrl+\
Undo selection	F9

You can cancel a selection in a directory window by using the Deselect All command. The selection cursor does not move.

To cancel all selections, do the following:

1 Select the File menu.
2 Choose the Deselect All command.

You can cancel your most recent selection in a directory window by using the Undo Selection command.

To undo your last selection, follow these steps:

[1] Select the File menu.
[2] Choose the Undo Selection command.

Using the System Menu in a File System Window

Each window in File System has a System menu. It is located in the upper-left corner of the window.
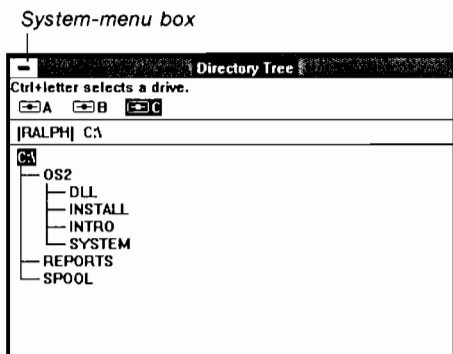
System-menu box

```
┌─────────────────────────────────────────────┐
│ ─ ░░░░░░░░░░░░░░ Directory Tree ░░░░░░░░░░░░░ │
│ Ctrl+letter selects a drive.                 │
│ ⊞A   ⊞B   ⊞C                                 │
│ ┌───────────────────────────────────────────┐│
│ │ |RALPH| C:\                                ││
│ │ C:\                                        ││
│ │  ┌─ OS2                                    ││
│ │  │   ├─ DLL                                ││
│ │  │   ├─ INSTALL                            ││
│ │  │   ├─ INTRO                              ││
│ │  │   └─ SYSTEM                             ││
│ │  ├─ REPORTS                                ││
│ │  └─ SPOOL                                  ││
│ │                                            ││
│ └───────────────────────────────────────────┘│
└─────────────────────────────────────────────┘
```

To select the System menu by using a mouse, do the following:

▶ Click the System-menu box.

To select the System menu in a File System window by using the keyboard, do the following:

▶ Press ALT+SPACEBAR and then press the RIGHT key, or press and hold down CTRL and press – (hyphen key).

The following list describes the commands on the System menu in File System windows:

Command	Action
Next	Selects the next window in the work area
Move	Moves the active window in the work area
Size	Changes the size of the active window
Close	Closes the active window

Selecting a Window

If more than one window is open in File System, you must select the window you want to work in. There are several ways to do this by using a mouse or the keyboard.

To select a window by using a mouse, do the following:

▶ Click the window.

To select a window by using the keyboard, you use the Next command on the System menu in the active window. Follow these steps:

1️⃣ To select the System menu in the active window, press and hold down CTRL and press – (hyphen key).
2️⃣ Press T to choose the Next command.
3️⃣ Repeat this process until you select the window you want.

You can also use the Window menu to select windows. The Window menu lists all windows, including the Directory Tree window and any open directory windows (listed by directory name). As you open directory windows, each directory name is added to the Window menu.

```
Window
Refresh                 F5
Close all directories

1. Directory tree
✓2. C:\OS2\INTRO
```
— Directory list

To select a window by using the Window menu, do the following:

1️⃣ Select the Window menu.
2️⃣ Choose the window you want.

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Using File System Commands

Before you start working with File System commands, you should become familiar with MS OS/2 naming conventions for files, directories, and disk drives. Although with File System you can use the selection cursor to select files, directories, or disk drives, you may occasionally need to type the names for these items; for example, in a dialog box or while you are working with the MS OS/2 command interpreter.

Naming Files and Directories

The filenames and directory names you create in MS OS/2 can be up to eight characters long. You can add an *extension*, three additional characters, to a filename or directory name, but these must be separated from the name by a period (.).

Copy

Current directory is   C:\OS2\INTRO

From ATHENS.BRK

To |

[Copy]   [Cancel]   [Help]

Extension
Filename
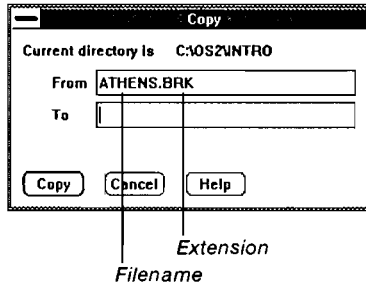
Often, applications such as word processors automatically add extensions when you create files.

The following characters are reserved for MS OS/2 and cannot be used in directory names or filenames:

< > + = ; , . " / \ [ ]

MS OS/2 also reserves some filenames for its use. The following filenames are reserved:

CLOCK$	LPT2
COM1	LPT3
COM2	NUL
COM3	POINTER$
CON	PRN
KBD$	SCREEN$
LPT1	

There are two useful characters called *wildcard characters*—the question mark (?) and asterisk (*). These characters have special meaning to MS OS/2. They can take the place of any other characters when you are specifying filenames to MS OS/2.

The question mark replaces any single character. For example, AUG?.TXT matches the files AUG1.TXT, AUG2.TXT, and AUGA.TXT.

Printer Name

The asterisk replaces zero or more characters in a filename. It matches any character. For example, AUG*.* matches any filename that begins with AUG: the filenames from the previous example (AUG1.TXT, AUG2.TXT, and AUGA.TXT), as well as filenames such as AUGUST.DOC or simply AUG.

```
┌────────────────────────────────────────────┐
│ ─         ▓▓▓▓▓▓▓▓▓▓▓ Delete ▓▓▓▓▓▓▓▓▓▓▓    │
│                                             │
│  Current directory is   C:\OS2\INTRO        │
│                                             │
│  Delete  │AUG*.*│                           │
│                                             │
│                                             │
│  ┌────────┐  ┌────────┐  ┌──────┐           │
│  │ Delete │  │ Cancel │  │ Help │           │
│  └────────┘  └────────┘  └──────┘           │
└────────────────────────────────────────────┘
```
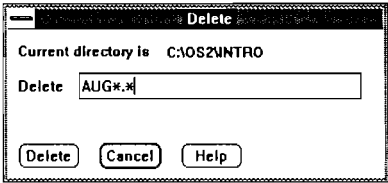
Specifying File Locations

When you are using System commands in File System, you can specify the exact location of a file or directory. This is called giving the *path*. The path includes all directory information MS OS/2 needs to find a file and has the following form:

[*directory*...][*directory*...]*directory*

The information inside the square brackets ([ ]) is optional, indicating that you could have more than one directory in a path. Each directory name is separated by a backslash (\\). The first backslash represents the root directory. You need to specify a path with a filename only if the file is not in the current directory.

```
┌────────────────────────────────────────────┐
│ ─         ▓▓▓▓▓▓▓▓▓▓▓ Copy ▓▓▓▓▓▓▓▓▓▓▓▓     │
│                                             │
│  Current directory is   A:\ACCOUNTS         │
│                                             │
│    From  │PASTDUE.DOC│                       │
│                                             │
│    To    │\COLLECT\PASTDUE.DOC│             │
│           _____/        │
│  ┌────────┐  ┌────────┐  ┌──────┐           │
│  │ Copy   │  │ Cancel │  │ Help │           │
│  └────────┘  └────────┘  └──────┘           │
└────────────────────────────────────────────┘
```
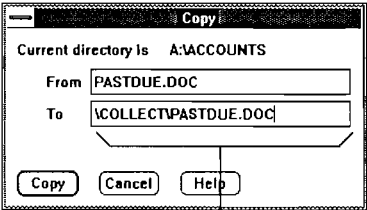
                        Path

You can add a disk-drive designation to a path. You need to add this information if, for example, you are copying a file to a directory on a different disk-drive. The disk-drive designation has the following form:

drive:

The following example shows the drive designation, path, and filename—the PASTDUE.DOC file in the ACCOUNTS directory on drive A will be copied to the COLLECT directory on drive C.

Disk drive where file will be copied

```
┌─────────────────────────────────────────────┐
│ ▬         ░░░░░░░░░░ Copy ░░░░░░░░░░░░░░       │
│                                               │
│ Current directory is   A:\ACCOUNTS            │
│                                               │
│ From  ┌───────────────────────────────────┐  │
│       │ PASTDUE.DOC                       │  │
│       └───────────────────────────────────┘  │
│ To    ┌───────────────────────────────────┐  │
│       │ C:\COLLECT\PASTDUE.DOC            │  │
│       └───────────────────────────────────┘  │
│                                               │
│   ( Copy )    ( Cancel )    ( Help )          │
│                                               │
└─────────────────────────────────────────────┘
```
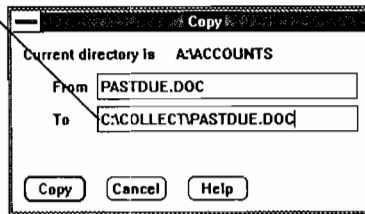
Changing Information in the Directory Tree Window

You can use the Tree menu commands to change the way directories
are displayed in the Directory Tree window.

```
┌──────────────────────────────────────────────────────────────┐
│ ▬       ░░░░░░░░░░░░ File System ░░░░░░░░░░░░░         ⬇ ⬆      │
│ File  Options │Tree│ Arrange  Window  Exit       F1=Help       │
│ ▬            ┌─────────────────────────┐                       │
│ Ctrl+letter se│ ✓ Show outline tree    │                       │
│ ⊞A    ⊞B      │   Expand one level   +  │                       │
│ [RALPH] C:\   │   Expand branch      *  │                       │
│               │   Expand all    Ctrl+*  │                       │
│ ⊟C:\          │   Collapse branch    -  │                       │
│  ├─⊟OS2       └─────────────────────────┘                      │
│  │    ├── DLL                                                  │
│  │    ├── INSTALL                                              │
│  │    ├─⊟ INTRO                                                │
│  │    │   └── OLDGAMES                                         │
│  │    └── SYSTEM                                               │
│  ├── REPORTS                                                   │
│  └── SPOOL                                                     │
│                                                                │
└──────────────────────────────────────────────────────────────┘
```
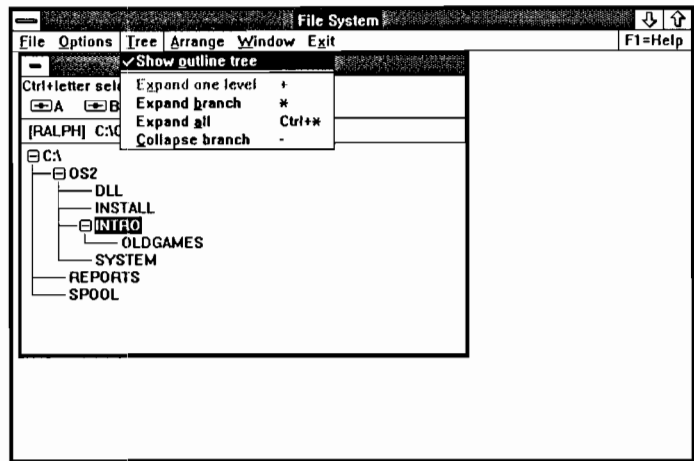
When you first start File System, the entire directory structure is
shown. All directories and subdirectories are listed in the Directory
Tree window.

The first command on the Tree menu, Show Outline Tree, lets you
control the amount of directory information that is displayed for
individual directories.

```
┌──────────────────────────────────────────┐
│ ■        Directory Tree                    │
│ Ctrl+letter selects a drive.               │
│ ⊞A   ⊞B   ⊟C                               │
├────────────────────────────────────────────┤
│ [RALPH] C:\                                 │
│                                             │
│ ⊟ C:\                                       │
│  └─⊟OS2                                     │
│      ├── DLL                                │
│      ├── INSTALL                            │
│      ├─⊟INTRO                               │
│      │    └── OLDGAMES                      │
│      └── SYSTEM                             │
│  ├── REPORTS                                │
│  └── SPOOL                                  │
│                                             │
└────────────────────────────────────────────┘
```
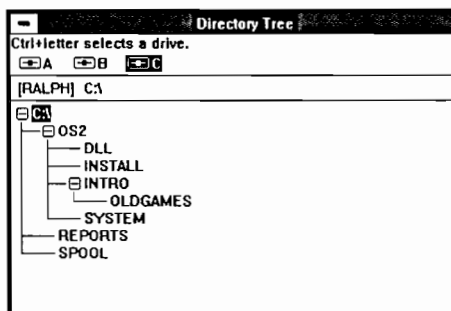
If you choose the Show Outline Tree command, a minus sign (–)
is added to the directory name in the window. You use these to
"collapse," or hide, individual subdirectories.

```
⊟OS2
 ├── DLL
 ├── INSTALL
 ├─⊟INTRO
 │    └── OLDGAMES
 └── SYSTEM
```

After a directory is collapsed, only the directory name is displayed, no
subdirectories are listed beneath the directory name, and the minus
sign changes to a plus sign (+).

```
⊟OS2
 ├── DLL
 ├── INSTALL
 ├─⊞INTRO
 └── SYSTEM
```

You "expand" a collapsed directory to see the directory levels again.

To change the information displayed in the Directory Tree window, do
the following:

▶ Select the Tree menu and choose the Show Outline Tree command.

```
Tree
✓ Show outline tree
  Expand one level    +
  Expand branch       *
  Expand all          Ctrl+*
  Collapse branch     -
```
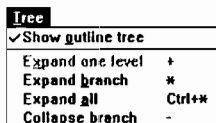
After choosing the Show Outline Tree command, you can use the other commands on the Tree menu to control the amount of information you want displayed in the Directory Tree window.

Collapsing a Directory Level

You can collapse a directory so that the subdirectories are hidden—the minus sign (–) changes to a plus sign (+) next to the directory name.

To collapse a directory level by using a mouse, do the following:

[1] Select the directory you want to collapse.

[2] Click the minus sign (–) to the left of a directory name.

```
─                      Directory Tree
Ctrl+letter selects a drive.
⊞A    ⊞B    ⊟C

[RALPH] C:\OS2

⊟C:\
 ├─⊟ OS2
 │    ├── DLL
 │    ├── INSTALL
 │    ├── INTRO
 │    └── SYSTEM
 ├── REPORTS
 └── SPOOL
```
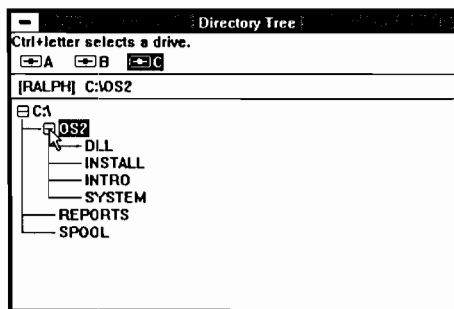
To collapse a directory level by using the keyboard, do the following:

[1] Select the directory you want to collapse using the DIRECTION keys.

[2] Select the Tree menu and choose the Collapse Branch command, or press – (minus or hyphen key).

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Expanding a Directory

You can expand a directory to see its subdirectories.

To expand a directory by using a mouse, follow this step:

▶ Click the plus sign (+) next to the directory you want to expand.

To expand a directory by using the keyboard, do the following:

1 Select the directory you want to expand.
2 Select the Tree menu and choose the Expand One Level command, or press + (plus key).

Another command on the Tree menu, Expand Branch, lets you see all the directory levels beneath a selected directory.

```
┌─────────────────────────────────────────────┐
│ ─        ▓▓▓▓▓▓▓▓▓▓ Directory Tree ▓▓▓▓▓▓▓▓▓▓ │
├─────────────────────────────────────────────┤
│ Ctrl+letter selects a drive.                  │
│ ⊞A    ⊞B   ⊟C                                 │
├─────────────────────────────────────────────┤
│ [RALPH]  C:\REPORTS                           │
├─────────────────────────────────────────────┤
│ ⊟ C:\                                         │
│   ├─⊞ OS2                                      │
│   ├─⊟ REPORTS                                  │
│   │   ├── PROPOSAL                             │
│   │   └─⊟ STATUS                               │
│   │       ├── 1988                             │
│   │       └── 1989                             │
│   └── SPOOL                                    │
│                                               │
│                                               │
└─────────────────────────────────────────────┘
```
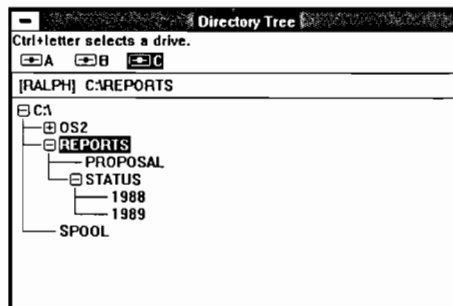
Follow these steps to use the Expand Branch command:

1 Select the directory you want to expand.
2 Select the Tree menu and choose the Expand Branch command.

To display all the directory levels in the Directory Tree window at once, do the following:

▶ Select the Tree menu and choose the Expand All command.

Changing Information in a Directory Window

In directory windows, files are listed by filename only and are sorted in alphabetical order (the default). You can change how files are listed and what file information is displayed by using the Display Options and Full File Details commands on the File System Options menu.

Options

Display options...	F2
Full file details	Ctrl+=
File options...	
Minimize on run	

The Display Options command gives you several choices regarding how file information is shown in directory windows. You can control which files are listed, how the files are sorted, and how much file information appears.

You can also control whether the changes you make affect the file listings in all directory windows or in an individual window. If the Directory Tree window is the active File System window when you use either command, the changes you make will affect all directory windows. If a directory window is active, the changes will affect only that directory window.

To change how information is shown in a directory window, do the following:

[1] Select the directory window you want to change (to change all the directory windows, select the Directory Tree window).

[2] Select the Options menu and choose the Display Options command.

The Display Options dialog box appears.

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```
┌─────────────────────────────────────┐
│ ▬    ░░░░░░░░ Display Options ░░░░░░░ │
│                                      │
│  Name  │*.*          │               │
│  ┌─Include──────────────────────────┐│
│  │ File types                        ││
│  │  ● All files      ○ Programs only ││
│  │  ○ Directories only ○ Data files only││
│  │ File attributes                   ││
│  │  ⊠ Read-only files                ││
│  │  ⊠ All other attributes  □ Hidden files││
│  │ ┌─Display──────┐ ┌─Sort by──────┐ ││
│  │ │□ Full file details│ │● Name     │ ││
│  │ │⊠ Directory size   │ │○ Extension│ ││
│  │ │              │ │○ Date and time│ ││
│  │ └──────────────┘ │○ Size        │ ││
│  │                  └──────────────┘ ││
│  │ ( Set display )  ( Cancel )  ( Help )││
│  └───────────────────────────────────┘│
└─────────────────────────────────────┘
```
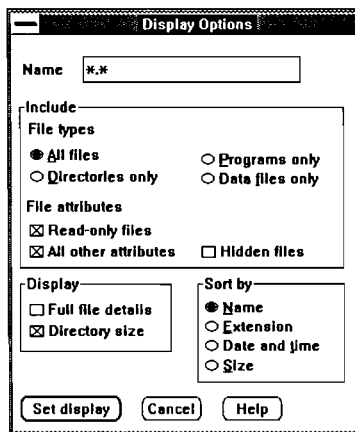
3. Change any of the settings in the dialog box.

   For more information on completing each section of the Display Options dialog box, see the information following this list.

4. Choose the Display Now button. If the Directory Tree window is active, choose the Set Display button. To cancel your changes, choose the Cancel button.

In the Name text box, you can specify which files you want to include in the listing. The default is *.*, meaning all the files in the directory.

The Include section of the Display Options dialog box controls which files are included in the directory listing.

```
┌─Include──────────────────────────┐
│ File types                        │
│  ● All files      ○ Programs only │
│  ○ Directories only ○ Data files only│
│ File attributes                   │
│  ⊠ Read-only files                │
│  ⊠ All other attributes  □ Hidden files│
└───────────────────────────────────┘
```
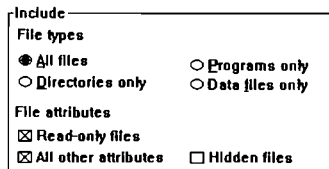
Under File Types in the Include section, you can select which of the following files you want listed:

- All Files (the default)
- Directories Only
- Programs Only (files with a .COM, .EXE, or .CMD filename extension)
- Data Files Only (files other than program files)

Under File Attributes in the Include section, you can select one or all of the following attributes you want listed with your files (file attributes are part of the directory information that identifies a file to MS OS/2):

- Read-Only Files (the default, files that cannot be edited or changed)
- All Other Attributes (the default)
- Hidden Files (files that do not appear in directory listings)

The Display section contains the Full File Details and Directory Size check boxes.

```
┌Display───────────┐
│ ☐ Full file details │
│ ☒ Directory size   │
└──────────────────┘
```

The Full File Details option displays all file information—file size, date and time the file was created, and file attributes—on each file in the directory window. The Directory Size option (the default) displays the size of the directory and the number of selected files at the top of each directory window. You can choose both options.

The Sort By section determines the order in which the files appear in a directory window.

```
┌Sort by───────────┐
│ ● Name             │
│ ○ Extension        │
│ ○ Date and time    │
│ ○ Size             │
└──────────────────┘
```

You can sort files in the following ways:

- Alphabetically by name (the default)
- Alphabetically by file extension
- By date and time the file was created
- By size (the largest file appears first)

You can use the Full File Details command on the Options menu as a shortcut to displaying complete file information in directory windows.

```
Options
 Display options...    F2
✓Full file details    Ctrl+=
 File options...
 Minimize on run          C:\OS2\INTRO\*.*
 9 file(s) [109 kilobytes] of 9. 8116 kilobytes free.
 ☐ OLDGAMES              11/9/88  12:19:08 pm  —
 ☐ ACLOCK.EXE     11264  10/27/88 06:53:28 am  -A-
 ☐ APLTREE.BRK      738  10/26/88 01:53:48 pm  -A-
 ☐ ATHENS.BRK      6878  10/28/88 08:49:52 am  -A-
 ☐ ATLANTIS.BRK   17098  10/26/88 01:54:26 pm  -A-
 ☐ BRICKS.EXE     36864  11/2/88  04:25:06 pm  -A-
 ☐ PARIS.BRK       8818  10/28/88 08:36:04 am  -A-
 ☐ SEATTLE.BRK    21578  10/26/88 01:55:00 pm  -A-
 ☐ TOKYO.BRK       9058  10/26/88 01:55:22 pm  -A-
```

Choosing this command has the same effect as turning on the Full File Details check box in the Display Options dialog box.

Follow these steps to use the Full File Details command:

[1] Select the directory window you want (if you want to see complete file information for all directory windows, select the Directory Tree window).
[2] Select the Options menu and choose the Full File Details command.

Updating a File System Window

As you use File System commands to organize and manage your files, the information in directory windows may become out-of-date or inaccurate. You can use the Refresh command on the Window menu to update all of your directory windows and the Directory Tree window.

To use the Refresh command, do the following:

▶ Select the Window menu and choose the Refresh command.

Arranging Windows in File System

File System has two commands on the Arrange menu to help you organize the way windows appear on your screen: Cascade and Tile. These commands arrange File System windows the same way the Cascade and Tile commands in Task Manager arrange your Presentation Manager screen.

The Cascade command arranges windows so that they overlap, starting in the upper-left corner of the File System work area. The title bar of each window remains visible.
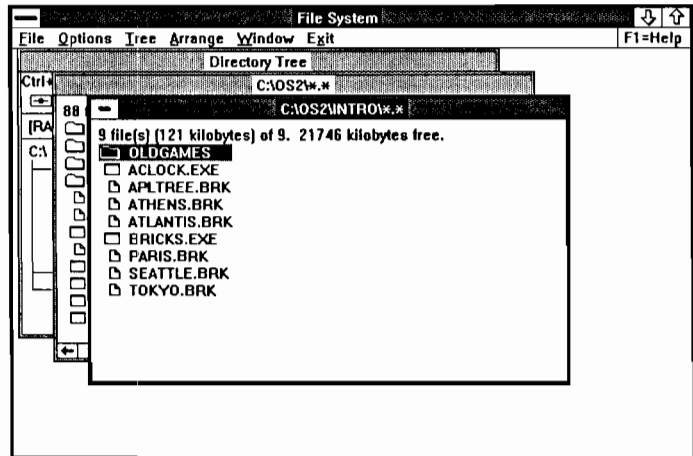
The Tile command arranges windows so that each window is visible side-by-side and none of the windows overlap.

```
┌─────────────────────────── File System ─────────────────────┬──┬──┐
│ File  Options  Tree  Arrange  Window  Exit          F1=Help  │
├──┬────── C:\OS2\INTRO\*.* ─────┬───────── C:\OS2\*.* ────────────┤
│  │9 file(s) (111 kilobytes) of 9. 21666 kilobytes fr│88 file(s) (2520 kilobytes) of 88. 21666 kilobyt│
│  │ 🗀 OLDGAMES                │ 🗀 DLL          🗀 ANSI.SYS          │
│  │ 🗀 ACLOCK.EXE              │ 🗀 INSTALL      🗀 APPEND.EXE        │
│  │ 🗀 APLTREE.BRK             │ 🗀 INTRO        🗀 ASSIGN.COM        │
│  │ 🗀 ATHENS.BRK              │ 🗀 SYSTEM       🗀 ATTRIB.EXE        │
│  │ 🗀 ATLANTIS.BRK            │ 🗀 4201.DCP     🗀 BACKUP.COM        │
│  │ 🗀 BRICKS.EXE              │ 🗀 5202.DCP     🗀 CHKDSK.COM        │
│  │ 🗀 PARIS.BRK               │ 🗀 ANSI.EXE     🗀 CMD.EXE           │
│  │ 🗀 SEATTLE.BRK             ├──────────────────────────────────────┤
│  │ 🗀 TOKYO.BRK               │ ◄                                ► │
│  │                           ├───────── Directory Tree ──────────┤
│  │                           │Ctrl+letter selects a drive.        │
│  │                           │ 🖴A   🖴B   🖴C                      │
│  │                           │|RALPH| C:\OS2                      │
│  │                           │C:\                               ↑ │
│  │                           │  ├─OS2                            │
│  │                           │     ├─DLL                         │
│  │                           │     ├─INSTALL                     │
│  │                           │     ├─INTRO                       │
│  │                           │     └─OLDGAMES                  ↓ │
└──┴───────────────────────────┴────────────────────────────────────┘
```

To use the Tile or Cascade command, do the following:

▶ Select the Window menu and choose either the Tile or Cascade command.

Working with Directories

You can also use File System commands while you work with directories.

Creating a Directory

You can create new directories by using the Create Directory command. File System creates a subdirectory of the current directory. To create a directory in a different location, you type the complete path of the new directory in the Create Directory dialog box (for example, **\1989\books**).

To use the Create Directory command, follow these steps:

1. Select the File menu and choose the Create Directory command. The Create Directory dialog box appears.

```
┌──────────────────────────────────────────┐
│ ━━              Create Directory           │
├──────────────────────────────────────────┤
│                                            │
│  Current directory is   C:\OS2\INTRO       │
│                                            │
│  New directory name   [_____]   │
│                                            │
│                                            │
│  (Create)   (Cancel)   (Help)              │
│                                            │
└──────────────────────────────────────────┘
```
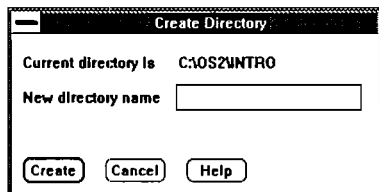
The current directory is shown in the dialog box.

2. To create a subdirectory of the current directory, type the name in the New Directory Name text box; to create a directory in a different location, type the complete directory path.

3. Choose the Create button.

You can copy files into the directory by using the Move or Copy commands on the File menu, or you can create files by using your application. For more information on these commands, see "Working with Files," later in this chapter.

Deleting a Directory

You can delete a directory by using the Delete command on the File menu. Deleting a directory also deletes any files or directories within the directory.

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To delete a directory, do the following:

1. Select the directory you want to delete from the Directory Tree window or from a directory window.
2. Select the File menu and choose the Delete command.

   The Delete dialog box appears.

```
┌─────────────────────────────────────┐
│ ▬          Delete                    │
├─────────────────────────────────────┤
│ Current directory is   C:\OS2\INTRO  │
│                                      │
│ Delete  │OLDGAMES            │       │
│         └────────────────────┘       │
│                                      │
│ [Delete]   [Cancel]   [ Help ]       │
└─────────────────────────────────────┘
```
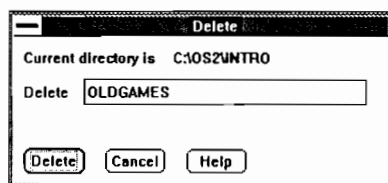
The selected directory name is displayed in the Delete text box.

3. Choose the Delete button.

   A warning message appears, asking you to confirm that you want to delete the directory and any files or directories contained within it.

```
┌──────────────────────────────────┐
│            File System           │
│                                  │
│ OLDGAMES is a directory. Are you sure │
│ that you want to delete it?  ALL FILES AND │
│ DIRECTORIES IN IT WILL BE DELETED if │
│ you select YES.                  │
│  [ Yes ]      [ No ]             │
└──────────────────────────────────┘
```
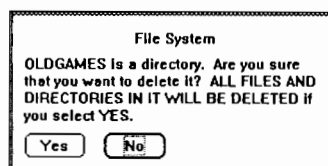
4. Choose the Yes button to delete the directory; choose the No button to cancel the command.

You can turn off the Delete warning message by using the File Options command on the Options menu. Warning messages appear when you use some File System commands.

Follow these steps to use the File Options command:

[1] Select the Options menu and choose the File Options command. The File Options dialog box appears.

```
┌─────────────────────────────────┐
│ ▬       ░░ File Options ░░       │
├─────────────────────────────────┤
│ ⊠ Confirm on delete             │
│ ⊠ Confirm on subtree delete     │
│ ⊠ Confirm on replace            │
│ ☐ Verify on copy                │
│ ┌─────┐ ┌────────┐ ┌──────┐     │
│ │ Set │ │ Cancel │ │ Help │     │
│ └─────┘ └────────┘ └──────┘     │
└─────────────────────────────────┘
```
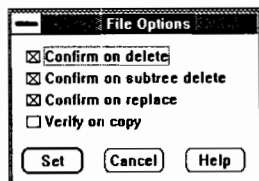
[2] Turn off the Confirm On Subtree Delete check box.

[3] Choose the Set button.

Moving a Directory

You can move a directory by dragging it with a mouse or by using the Move command on the File menu.

To move a directory by using a mouse, follow these steps:

[1] Open a window on the directory that contains the directory you want to move (for example, if the directory is in your root directory, open a root-directory window).

[2] Open a directory window on the destination directory.

[3] Click the directory you want to move.

[4] Press and hold down ALT and drag the directory icon to the destination directory window.

Both windows must be visible in order for you to move directories by using a mouse. When you release the mouse button, a copy of the directory appears in the destination directory window. You can move a directory only to another directory window, not to the Directory Tree window.

To move a directory by using the keyboard, follow these steps:

① Open a window on the directory that contains the directory you want to move.

② Select the directory you want to move.

③ Select the File menu and choose the Move command.
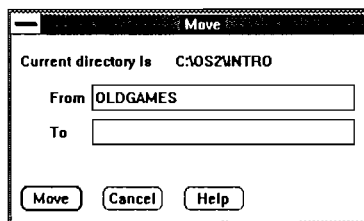
The Move dialog box appears.

```
┌─────────────────────────────────────┐
│ ━         Move                       │
├─────────────────────────────────────┤
│ Current directory is   C:\OS2\INTRO  │
│                                      │
│    From │OLDGAMES              │     │
│                                      │
│    To   │                      │     │
│                                      │
│ ( Move )  ( Cancel )  ( Help )       │
└─────────────────────────────────────┘
```

The directory you selected appears in the From text box.

④ Type the destination directory in the To text box.

⑤ Choose the Move button.

You can move more than one directory at a time by extending your selection. For more information on extending a selection in a directory window, see "Selecting in a Directory Window," earlier in this chapter.

Copying a Directory

You can copy one directory to another by using either a mouse or the Copy command on the File menu.

To copy directories by using a mouse, follow these steps:

① Open a window on the directory that contains the directory you want to copy (for example, if the directory is a subdirectory of your root directory, open a root-directory window).

② Open a directory window on the destination directory.

③ Drag the directory icon to the destination directory window.

Both directory windows must be visible in order for you to copy directories by using a mouse. When you release the mouse button, a copy of the directory appears in the destination directory window.

Follow these steps to copy directories by using the keyboard:

1 Open a window on the directory that contains the directory you want to copy.

2 Select the directory you want to copy.

3 Select the File menu and choose the Copy command.

The Copy dialog box appears.

```
┌─────────────────────────────────────────┐
│ ▬                  Copy                   │
├───────────────────────────────────────────┤
│ Current directory is    C:\OS2\INTRO      │
│                                           │
│     From  │OLDGAMES                    │  │
│                                           │
│     To    │                            │  │
│                                           │
│  ( Copy )  ( Cancel )  ( Help )           │
└───────────────────────────────────────────┘
```
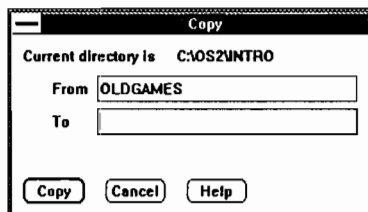
The directory you selected appears in the From text box.

4 Type the destination directory in the To text box.

5 Choose the Copy button.

You can copy more than one directory at a time to a destination directory by extending your selection in the directory window. For more information on extending a selection in a directory window, see "Selecting in a Directory Window," earlier in this chapter.

Renaming a Directory

You can rename a directory by using the Rename command on the File menu.

To rename a directory, do the following:

1. Open a window on the directory that contains the directory you want to rename.
2. Select the directory you want to rename.
3. Select the File menu and choose the Rename command.

   The Rename dialog box appears.

```
┌─────────────────────────────────────────────┐
│ ▬            ▓ Rename ▓                        │
├─────────────────────────────────────────────┤
│  Current directory is   C:\OS2\INTRO          │
│                                               │
│      From  │OLDGAMES                       │  │
│                                               │
│      To    │                               │  │
│                                               │
│  ┌────────┐  ┌────────┐  ┌──────┐             │
│  │ Rename │  │ Cancel │  │ Help │             │
│  └────────┘  └────────┘  └──────┘             │
└─────────────────────────────────────────────┘
```
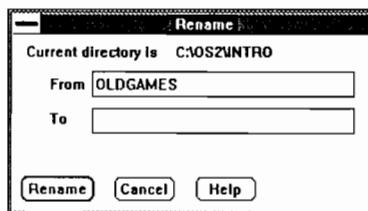
The directory you selected appears in the From text box.
4. Type the new name in the To text box.
5. Choose the Rename button.

Working with Files

File System commands can be used to organize your files.

Moving a File

You can move a file by dragging it with the mouse or by using the Move command on the File menu.

To move a file between directories by using a mouse, follow these steps:

[1] Open a window on the directory that contains the file you want to move.

[2] Open a window on the destination directory.

[3] Click the file you want to move.

[4] Press and hold down ALT and drag the file icon to the destination directory.

Both directory windows must be visible in order for you to move files by using a mouse.

To move a file by using the keyboard, follow these steps:

[1] Open a window on the directory that contains the file you want to move.

[2] Select the file in the directory window.

[3] Select the File menu and choose the Move command.
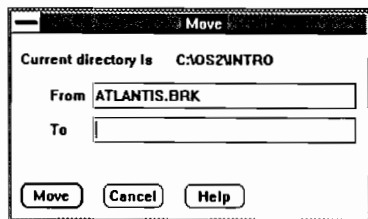
The Move dialog box appears.

Move
Current directory is   C:\OS2\INTRO
From ATLANTIS.BRK
To	
(Move)   (Cancel)   (Help)

The file you selected appears in the From text box.

[4] Type the destination directory in the To text box.

[5] Choose the Move button.

You can move more than one file to another directory by extending your selection in the directory window or by using wildcard characters to specify filenames in the Move dialog box.

Copying a File

You can copy a file by using a mouse or by using the Copy command on the File menu. If you use a mouse to copy a file, the file must be copied to a different directory. To create a copy of a file in the same directory, use the Copy command on the File menu.

To copy a file by using a mouse, follow these steps:

1 Open a window on the directory that contains the file you want to copy.

2 Open a window on the destination directory.

3 Click the file you want to copy.

4 Drag the file icon to the destination directory.

Follow these steps to copy a file by using the keyboard:

1 Open a window on the directory that contains the file you want to copy.

2 Select the file you want to copy.

3 Select the File menu and choose the Copy command.

The Copy dialog box appears.

```
┌─────────────────────────────────────────┐
│ ━━        ░░░░░Copy░░░░░░               │
│                                           │
│ Current directory is   C:\OS2\INTRO      │
│                                           │
│     From │TOKYO.BRK                  │   │
│                                           │
│     To   │                           │   │
│                                           │
│ ┌──────┐  ┌────────┐  ┌──────┐          │
│ │ Copy │  │ Cancel │  │ Help │          │
│ └──────┘  └────────┘  └──────┘          │
└─────────────────────────────────────────┘
```
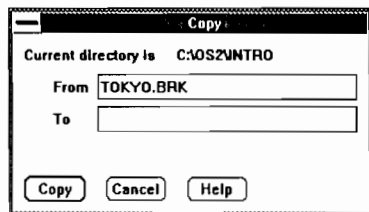
The file you selected appears in the From text box.

4 Type the new filename, or the path of the directory you want to copy the file to, in the To text box.

5 Choose the Copy button.

You can copy more than one file at a time, either by using wildcard characters to specify filenames in the Copy dialog box or by extending your selection in the directory window.

The File Options command on the Options menu contains two options that you can use when copying files: Confirm On Replace and Verify On Copy.

```
┌─────────────────────────────────┐
│ ▬        File Options            │
├─────────────────────────────────┤
│ ⊠ Confirm on delete              │
│ ⊠ Confirm on subtree delete      │
│ ⊠ Confirm on replace             │
│ □ Verify on copy                 │
│                                  │
│  ( Set )  ( Cancel )  ( Help )   │
└─────────────────────────────────┘
```
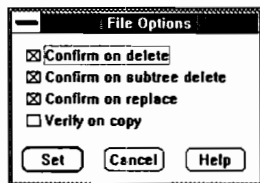
The Confirm On Replace check box displays a warning message if you attempt to copy a file to an existing filename. The Verify On Copy check box tells File System to check that an exact copy of the file was created.

To turn on the Confirm On Replace option and/or the Verify On Copy option, do the following:

1. Select the Options menu and choose the File Options command.
2. Turn on the options you want.
3. Choose the Set button.

Renaming a File

You can rename a file by using the Rename command on the File menu. Follow these steps:

1. Open a window on the directory that contains the file you want to rename.
2. Select the file you want to rename.
3. Select the File menu and choose the Rename command.

The Rename dialog box appears.

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```
┌─────────────────────────────────┐
│ ▬        Rename                  │
├─────────────────────────────────┤
│ Current directory is  C:\OS2\INTRO │
│                                  │
│  From │PARIS.BRK              │  │
│                                  │
│  To   │                       │  │
│                                  │
│ ┌────────┐ ┌────────┐ ┌──────┐  │
│ │ Rename │ │ Cancel │ │ Help │  │
│ └────────┘ └────────┘ └──────┘  │
└─────────────────────────────────┘
```
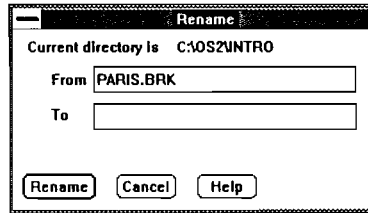
The file you selected appears in the From text box.

4 Type the new name in the To text box.

5 Choose the Rename button.

Deleting a File

You can delete a file by using the Delete command on the File menu. Follow these steps:

1 Open a window on the directory that contains the file you want to delete.

2 Select the file you want to delete.

3 Select the File menu and choose the Delete command.

The Delete dialog box appears.

```
┌─────────────────────────────────┐
│ ▬           Delete               │
├─────────────────────────────────┤
│ Current directory is  C:\OS2\INTRO │
│                                  │
│  Delete  │SEATTLE.BRK          │ │
│                                  │
│ ┌────────┐ ┌────────┐ ┌──────┐  │
│ │ Delete │ │ Cancel │ │ Help │  │
│ └────────┘ └────────┘ └──────┘  │
└─────────────────────────────────┘
```
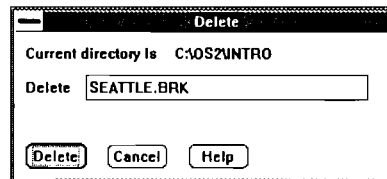
The file you selected appears in the Delete text box.

4 Choose the Delete button.

You can delete more than one file at a time, either by using wildcard characters to specify filenames in the Delete dialog box or by selecting more than one file in the directory window.

Note You cannot delete some MS OS/2 files. If you attempt to delete an MS OS/2 system file or a file that an application is using, you receive a message that the file cannot be deleted at the present time. Because MS OS/2 is a multitasking system, it protects you from deleting files that other programs are using, and protects you from deleting important system files, such as the OS2.INI file or the program files that are part of the operating system.

Printing a File

You can use the Print command on the File menu to print text files from File System. Most MS OS/2 applications have a print command you can use to print files that were created with the application. You should use that command, rather than the File System Print command, whenever possible. Before you use the Print command, you should set up your printer. If you did not set up a printer when you installed MS OS/2, add your printer using Control Panel. For more information, see Chapter 5, "Printing Files."

To print files from File System, follow these steps:

1. Select the file you want to print.
2. Select the File menu and choose the Print command.

Starting an Application

You can start an MS OS/2 application from File System by opening the program file. Application files have a .COM, .EXE, or .CMD filename extension. If the application can run in a window, the window will appear in front of File System when you start it. If the application is a full-screen application, the application screen will replace the Presentation Manager screen.

If the application is a DOS application, you cannot start it from File System. You must move to the DOS session to start it.

Note If you plan to use an application frequently, add it to Start Programs rather than starting it from File System. For more information on adding applications to Start Programs, see Chapter 2, "Running Applications with MS OS/2."

To start an application by using a mouse, do the following:

1. Open the directory window that contains the application file.
2. Double-click the filename.

To start an application by using the keyboard, do the following:

1. Open the directory window that contains the application file.
2. Select the application filename.
3. Select the File menu and choose the Open command.

Or

▶ Select the filename in the directory window and press ENTER.

You can use the Minimize On Run command on the Options menu to automatically shrink File System to an icon whenever you start an application.

```
Options
 Display options...    F2
 Full file details    Ctrl+=
 File options...
✓Minimize on run
```

To use the Minimize On Run command, do the following:

▶ Select the Options menu and choose the Minimize On Run command.

Associating Application Files

The Associate command allows you to associate an application file with other filename extensions. For example, you can associate data files with the application you used to create them. Often, the data files created with an application have a particular filename extension; for example, files created with the Bricks application have the filename extension .BRK. With the Associate command, you can associate the data filename extension with the application so that opening the data file in File System starts the application.

You can associate files in two ways:

- By selecting the program file and providing the filename extensions you want to associate with it.
- By selecting a filename extension and providing the program file you want to associate with it.

Follow these steps to use the Associate command:

1. Open a directory window that contains a file you want to associate. The file can be either a program file or a file with the filename extension that you want to associate.

2. Select the file you want to associate.

3. Select the File menu and choose the Associate command.

The Associate dialog box appears.

```
┌─────────────────────────────────────────┐
│ ▬                Associate                │
├─────────────────────────────────────────┤
│ BRICKS.EXE is associated with these file-name │
│ extensions:                               │
│ ┌─────────────────────────────────┬───┐ │
│ │ BRK                             │ ↑ │ │
│ │                                 ├───┤ │
│ │                                 │   │ │
│ │                                 │   │ │
│ │                                 │   │ │
│ │                                 ├───┤ │
│ │                                 │ ↓ │ │
│ └─────────────────────────────────┴───┘ │
│ (Enter)  (Cancel)  (Help)  (Add)  (Delete) │
└─────────────────────────────────────────┘
```
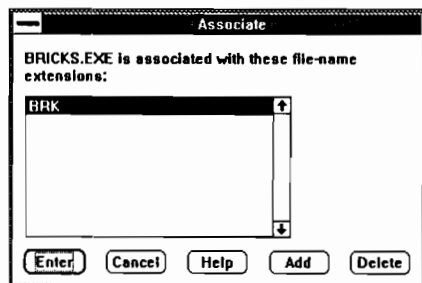
The program file or the filename extension of the data file is displayed. Any files or filename extensions that are already associated are listed.

4. Choose the Add button.

The Add Extension dialog box appears.

```
┌───────────────────────────────┐
│ ▬        Add Extension         │
├───────────────────────────────┤
│ New extension  [            ]  │
│ ( Add )  (Cancel)  ( Help )    │
└───────────────────────────────┘
```

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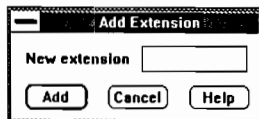
⑤ To associate an extension with a program file, type the extension in the New Extension text box and choose the Add button.

To associate an application file with an extension, type the path of the program file in the New Program text box and choose the Add button.

⑥ Choose the Enter button.

You can associate a filename extension with more than one application. Then when you open a file with an associated filename extension, a dialog box appears, asking you to select the application you want to start.

You can remove a file or a filename extension from the list of associated files. Follow these steps:

① Open a directory window that contains the application file or filename extension you want to delete.

② Select the file that you want to delete from the list of associated files.

③ Select the File menu and choose the Associate command.

If you choose an application file, a list of filename extensions associated with it is displayed. If you choose a file with an associated extension, a list of associated program files is displayed.

④ Select the item, either the program file or the filename extension, you no longer want associated.

⑤ Choose the Delete button.

⑥ Choose the Enter button.

Setting File Attributes

File attributes are part of the directory information for a file. This information helps identify a file to MS OS/2 and controls the kinds of operations you perform on the file. You can see the file attributes in a directory window by choosing the Full File Details command on the Options menu. This displays all the file information, including the attribute information, in a directory window.

```
┌─────────────────────────────────────────────────┐
│ ▇          C:\OS2\INTRO\*.*                        │
├─────────────────────────────────────────────────┤
│ 9 file(s) (109 kilobytes) of 9. 8106 kilobytes free. │
│ ▣ OLDGAMES              11/9/88  12:19:08 pm  ─   │
│ ▢ ACLOCK.EXE     11264  10/27/88 06:53:28 am  -A- │
│ ▢ APLTREE.BRK      738  10/26/88 01:53:48 pm  -A- │
│ ▢ ATHENS.BRK      6878  10/28/88 08:49:52 am  -A- │
│ ▢ ATLANTIS.BRK   17098  10/26/88 01:54:26 pm  -A- │
│ ▢ BRICKS.EXE     36854  11/2/88  04:25:06 pm  -A- │
│ ▢ PARIS.BRK       8818  10/28/88 08:36:04 am  -A- │
│ ▢ SEATTLE.BRK    21578  10/26/88 01:55:00 pm  -A- │
│ ▢ TOKYO.BRK       9058  10/26/88 01:55:22 pm  -A- │
│                                                   │
│                                                   │
│                                                   │
└─────────────────────────────────────────────────┘
```

Attributes can be turned on and off using the Change Attributes command on the File menu. There are four MS OS/2 file attributes:

- The *Read Only* attribute prevents a file from being changed. When it is turned on, the letter "R" appears in the attribute information column in the directory listing.

- The *Archive* attribute is turned on by MS OS/2 utilities such as **backup** and **xcopy**. When it is turned on, the letter "A" appears in the attribute information column in the directory listing. Other applications such as text editors then turn off this attribute to show that the file has been changed.

- The *Hidden* attribute prevents a file from appearing in most directory listings. When it is turned on, the letter "H" appears in the directory listing. You can display hidden files by using the Display Options command on the Options menu.

- The *System* attribute identifies a file as an MS OS/2 system file. When it is turned on, the letter "S" appears in the directory listing. You cannot delete the file when this attribute is set.

  This attribute, like the Hidden attribute, prevents a file from appearing in directory listings.

To turn file attributes on or off, do the following:

[1] Open a directory window that contains the file for which you want to set attributes.

[2] Select the file.

[3] Select the File menu and choose the Change Attributes command. The Change Attributes dialog box appears.

```
┌─────────────────────────────────────┐
│ ─      ░ Change Attributes ░         │
├─────────────────────────────────────┤
│ Select the attributes for all selected files │
│   ☐ Read Only    ☐ Hidden           │
│   ☒ Archive      ☐ System           │
│  ( Change )  ( Cancel )  ( Help )    │
└─────────────────────────────────────┘
```
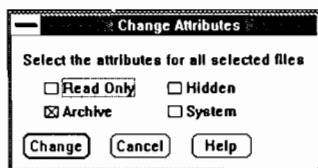
[4] Turn on or off the attributes you want.

[5] Choose the Change button.

You can change the attributes of more than one file at a time by extending your selection in the directory window.

Closing a Directory Window

You can close any windows in File System except the Directory Tree window. You can close directory windows by using the Close command on the System menu or by using a mouse.

To close a directory window by using a mouse, do the following:

▶ Double-click the System-menu box in the directory window.

To close a directory window by using the keyboard, do the following:

▶ Press and hold down CTRL and press – (hyphen key) to select the System menu in the directory window and choose the Close command.

You can close all directory windows at once by using the Close All Directories command on the Window menu.

```
Window
 Refresh                    F5
 Close all directories
 1. Directory tree
 2. A:\
 3. C:\OS2\INTRO
 4. C:\OS2\IN...\OLDGAMES
✓5. C:\REPORTS
```
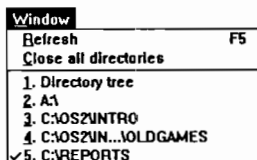
To close all directories, do the following:

▶ Select the Window menu and choose the Close All Directories command.

Quitting File System

You can quit File System by using the Exit File System command on the Exit menu. File System asks if you want to save your settings. If you choose to save settings, settings created with the following commands are saved:

- Display Options (Options menu)
- File Options (Options menu)
- Minimize On Run (Options menu)
- Show Outline Tree (Tree menu)

To quit File System, do the following:

1. Select the Exit menu and choose the Exit File System command. The Exit File System dialog box appears.
2. To save your settings, turn on the Save Settings check box.
3. Choose the Yes button.

If you choose the Resume command on the Exit menu, you return to File System.

4 Maintaining Disks

Introduction

MS OS/2 utilities are programs you can use to accomplish common tasks such as formatting floppy disks, making backup copies of files, and checking available storage space on disks. How you start a utility depends on the task you want to accomplish. For example, if you want to provide additional information such as a destination-disk drive or a filename when you start a utility, it makes sense to start the MS OS/2 command interpreter, **cmd**, and start the utility from the MS OS/2 command line. On the other hand, if MS OS/2 does not need any additional information in order to run the utility correctly, you should start it from File System. If you use a utility frequently, you may want to add it to Start Programs.

In this chapter, you'll find information on starting utilities from Start Programs. For more information on how to start utilities or other programs, see Chapter 2, "Running Applications with MS OS/2"; Chapter 8, "Using MS OS/2 Utilities"; and Chapter 11, "Maintaining Your System." For additional information on a particular utility, see the entry for the utility in the *Microsoft Operating System/2 Desktop Reference*.

Formatting a Floppy Disk

Before you use new floppy disks, you must format them by using the **format** utility. This prepares the disk so that MS OS/2 can store and retrieve information. The **format** utility writes directory information to the floppy disk, checks for unusable parts of the disk, and asks you to name the disk by prompting you for a *volume label*, a name that identifies the disk; this label can be up to eleven characters.

To start the **format** utility from Start Programs to format a floppy disk, do the following:

1. Move to Start Programs.
2. Select the Group menu and choose the Utility Programs group.
3. Choose Format Diskette.
4. The **format** utility starts and prompts you to insert a new floppy disk in drive A.
5. Insert the disk and press ENTER.

   As the disk is formatted, MS OS/2 displays messages showing its progress. After the formatting is complete, MS OS/2 prompts you for a volume label.

```
┌──────────────────────────────────────────────────────┐
│ ═  ░░░░░░░░░░░░░ Format diskette ░░░░░░░░░░░░  ⇩ ⇧ │
│ Insert a new diskette in drive A:                   ↑ │
│ and press Enter when ready.                           │
│                                                       │
│ Formatting has been completed.                        │
│                                                       │
│ Enter up to 11 characters for the volume label,       │
│ or press Enter for no volume label.                   │
│                                                       │
│                                                       │
│                                                       │
│                                                       │
│                                                    ↓  │
│ ←  ░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░░  → │
└──────────────────────────────────────────────────────┘
```
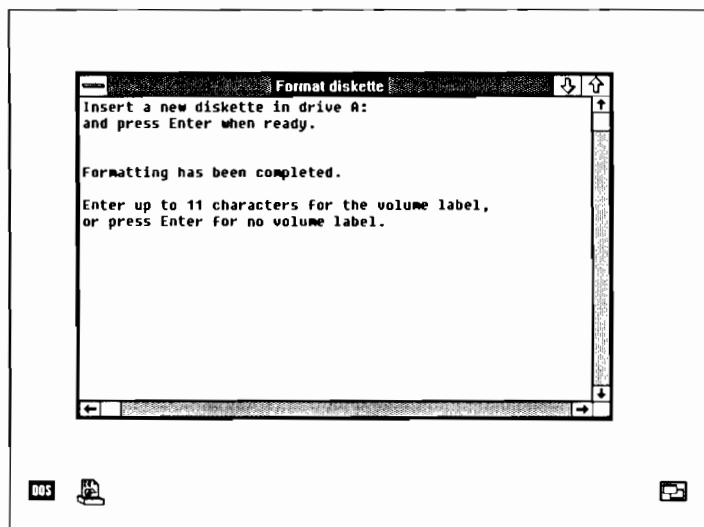
6 Type the name you want, or press ENTER if you don't want to name the disk.

7 MS OS/2 then asks if you want to format another disk. Choose either the Yes button or the No button.

To format a floppy disk in drive B, do the following:

1 Move to Start Programs.

2 Start OS/2 Windowed Command Prompt.

3 Type **format b:** at the prompt, and then press ENTER.

MS OS/2 asks you to insert a disk in drive B.

4 Insert the disk and press ENTER.

Checking Disk Space

The **chkdsk** utility shows you how much storage capacity your computer has available. In the DOS session, **chkdsk** also shows how much memory is available (memory in the DOS session is limited to 640K).

The following example is a typical **chkdsk** report:

```
┌──────────────────────────────────────────────────┬───┬───┐
│ ▬      Completed: Disk Information — CHKDSK         │ ⇩ │ ⇧ │
├────────────────────────────────────────────────────┴───┴───┤
│ Uolume RALPH created -- 18-18-1988  3:55pm            │ ↑ │
│                                                       │   │
│ 31715328 bytes total disk space.                      │   │
│        8 bytes in 1 hidden files.                     │   │
│    22528 bytes in 8 directories.                      │   │
│ 15448864 bytes in 338 user files.                     │   │
│    38728 bytes in bad sectors.                        │   │
│ 16214816 bytes available on disk.                     │   │
│                                                       │   │
│                                                       │   │
│                                                       │   │
│                                                       │   │
│                                                       │   │
│                                                       │ ↓ │
├───┬────────────────────────────────────────────────┬───┤
│ ← │                                                  │ → │
└───┴──────────────────────────────────────────────────┴───┘
```

The report begins by showing the disk volume label, if any, then the following information:

- Total disk space in bytes.
- The number of bytes occupied by hidden files. Hidden files are usually system files that don't appear in directory listings.
- The number of bytes occupied by directories.
- The number of files and bytes occupied by *user files*. User files are all files on your system except hidden files and directories.
- The number of bytes occupied by *bad sectors* on the disk, areas that cannot be used to store information.
- The total number of bytes available on the disk.

To convert the number of bytes available to kilobytes, divide the number of bytes by 1024.

To start the **chkdsk** utility, do the following:

1. Move to Start Programs.
2. Select the Group menu and choose the Utility Programs group.
3. Choose Disk Information—CIIKDSK.

   The **chkdsk** utility checks the storage space on the disk drive you started MS OS/2 from, and then displays a report.
4. After **chkdsk** finishes reporting on the disk drive, select the System menu and choose the Close command to close the window.

You can also check disk space on other disk drives. Follow these steps:

1. Move to Start Programs.
2. Start OS/2 Windowed Command Prompt.
3. At the **cmd** prompt, type **chkdsk**, the disk-drive letter (of the drive you want to check), and a colon (:).

   For example, you would type **chkdsk a:** to check the storage capacity of drive A.
4. After **chkdsk** finishes reporting on the disk drive, select the System menu and choose the Close command to close the window.

If a disk contains errors that affect recovering information, **chkdsk** displays a message. For more information on interpreting **chkdsk** messages and correcting disk errors, see Chapter 11, "Maintaining Your System" and the **chkdsk** entry in the *Microsoft Operating System/2 Desktop Reference*.

5 Printing Files

Introduction

Two Presentation Manager applications, Spooler Queue Manager and Control Panel, help you set up printers and control and organize your printing.

When you install MS OS/2 on your computer, the installation program asks for information about your printer. You can change this information by adding new printers, changing existing printers, or adding new printing software using the commands in Control Panel.

Spooler Queue Manager lets you control your print job after it is sent to your printer. With Spooler Queue Manager, you can cancel jobs or hold print jobs during printing. Spooler Queue Manager starts each time you start Presentation Manager. Its icon appears in the icon area when you turn on your computer or restart MS OS/2 by pressing CTRL+ALT+DEL.

Printing a File

If you have a printer connected to your computer, you can print text files from Presentation Manager, from the MS OS/2 command inter- preter (**cmd**), from the DOS session, or by using your application's print command.

To print a text file from Presentation Manager, follow these steps:

1. Switch to Start Programs and start File System.
2. In File System, open a directory window that contains the file you want to print.

③ In the directory window, select the file you want to print.

④ Select the File menu and choose the Print command.

File	
Open	Enter
Print	Shift+Print Screen
Associate...	
Move...	
Copy...	
Delete...	Delete
Rename...	
Change attributes...	
Create directory...	
Select all	Ctrl+/
Deselect all	Ctrl+\
Undo selection	F9

You use the **print** utility to print files from the MS OS/2 command interpreter (**cmd**) or from the DOS session by doing the following:

① Switch to Start Programs and start OS/2 Windowed Command Prompt. To print from the DOS session, use Task Manager to switch to the DOS session.

② At the prompt, type **print**, the directory path (if necessary), and the filename of the file you want to print.

③ Press ENTER.

For example, to print the file PROPOSAL.TXT in the PROJECT directory on drive C, you type the following:

print c:\project\proposal.txt

For more information on the **print** utility, see Chapter 8, "Using MS OS/2 Utilities," and the **print** entry in the *Microsoft Operating System/2 Desktop Reference*.

To print from your application, see your application manual for information on its print command.

Managing Printing with Spooler Queue Manager

Spooler Queue Manager helps you control printing. You should be
familiar with the following terms before you use Spooler Queue
Manager:

- A *print queue* is a list of files waiting to be printed. You must con-
  nect your printer to a print queue. A printer can have more than
  one queue, but it can be connected to only one queue at a time.
- A *print job* is a file that has been sent to your printer.
- A *job identifier* is a number that identifies the print job.

With Spooler Queue Manager, you can see the status of all of your
print jobs. You can see status information on an entire print queue or
on individual print jobs.

To check on the status of a print job, do the following:

▶ Switch to Spooler Queue Manager.

```
┌────────────────────────────────────────────────────────┬─────┐
│ ▭           ▒▒▒▒▒▒ Spooler Queue Manager ▒▒▒▒▒▒         │ ⇩ ⇧ │
├────────────────────────────────────────────────────────┼─────┤
│ Queue  Job  Special                                     │F1=Help│
├──────────────────────────────┬──────────────────────────┴─────┤
│ LPT10                1  Job(s)│                              ↑ │
│   1      SUMMARY.TXT  11/ 2/88 10:30:35  Printing               │
│                                                                 │
│                                                                 │
│                                                                 │
│                                                                 │
│                                                                 │
│                                                              ↓ │
└─────────────────────────────────────────────────────────────┘
```

In the Spooler Queue Manager work area you see each print queue
listed along with the number of print jobs (files) in the queue. Each
print job is identified by a job identifier, a filename, and the date and
time it was sent to your printer.

You use the selection cursor to select a print job or queue before you can use Spooler Queue Manager commands. You can select only one item at a time. If you select a print queue, you can use the commands on the Queue menu; if you select a print job, you can use the commands on the Job menu.

Controlling Print Queues

You can stop, restart, or cancel printing by controlling the print queue; for example, you may need to stop printing to change paper or fix a problem with your printer. You use the commands on the Queue menu to control print queues.

You can stop printing by using the Hold Queue command on the Queue menu. If a file is printing when you choose this command, it finishes printing.

To use the Hold Queue command, follow these steps:

1. Select a print queue in the Spooler Queue Manager work area.
2. Select the Queue menu and choose the Hold Queue command.

```
┌──────────────────────Spooler Queue Manager──────────────────────⬇ ⬆
│ Queue  Job  Special                                         F1=Help
│ LPT1Q           1  Job[s]   Queue held                              ↑
│    6      PROPOSAL.TXT  11/ 1/88 14:12:32
│
│
│
│
│
│
│                                                                    ↓
└──────────────────────────────────────────────────────────────────
```
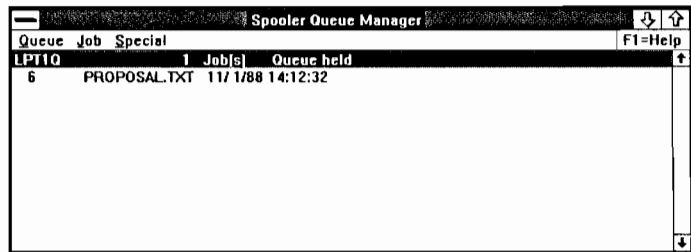
To resume printing, do the following:

1. Select the print queue in the Spooler Queue Manager work area.
2. Select the Queue menu and choose the Release Queue command.

Controlling Print Jobs

You can control print jobs—files that you are printing on a printer—using Spooler Queue Manager commands.
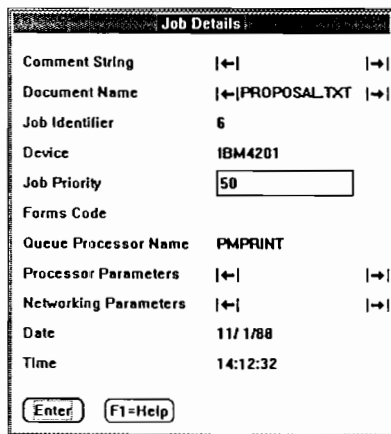
Looking at Print Job Information

You can find out information on a particular print job by using the Job Details command on the Job menu.

To see print job information, do the following:

1 Select the print job you want in the Spooler Queue Manager work area.

2 Select the Job menu and choose the Job Details command.

The Job Details dialog box appears (for an explanation of the information in the different dialog box areas, see the list following this procedure).

```
┌─────────────── Job Details ───────────────┐
│                                            │
│  Comment String        |←|            |→|  │
│  Document Name          |←|PROPOSAL.TXT |→| │
│  Job Identifier        6                   │
│  Device                IBM4201             │
│  Job Priority          [50        ]        │
│  Forms Code                                │
│  Queue Processor Name  PMPRINT             │
│  Processor Parameters  |←|            |→|   │
│  Networking Parameters |←|            |→|   │
│  Date                  11/ 1/88            │
│  Time                  14:12:32            │
│                                            │
│  ( Enter )  (F1=Help)                      │
└────────────────────────────────────────────┘
```

3 When you finish looking at the print job information, choose the Enter button.

The following list explains the different options that appear in the Job Details dialog box areas.

- The Comment String section lists the name of the application you used to send the print job. This section may be blank. If you print a file from the MS OS/2 command interpreter (**cmd**) or from the DOS session, "System" appears in this section.
- The Document Name section contains the name of the file you are printing.
- The Job Identifier section contains the identification number of your print job in the queue.
- The Device section contains the name of the device driver (the program that controls your printer). The name of the printer port appears in this area when your job is printing.
- The Job Priority box indicates the priority of your print job. This is represented by a number from 1 through 99; the default is 50 (the higher the number, the higher the priority).
- The Forms Code section shows the print-job paper size.
- The Queue Processor Name section contains the name of the program that sent the print job to your printer.
- The Processor Parameters section contains any additional information needed by the queue-processing program.
- The Networking Parameters section contains any additional information needed for sharing your printer over a network.
- The Date section shows the date you sent the print job to your printer.
- The Time section shows the time you sent the print job to your printer.

Canceling a Print Job

You can prevent a file from printing or stop it completely by canceling the print job. When you cancel a print job, the job is removed from the print queue.

To cancel a print job, use the Cancel Job command on the Job menu. Follow these steps:

[1] Select the print job you want to cancel in the Spooler Queue Manager work area.

```
─          ░░░░░░░░░░ Spooler Queue Manager ░░░░░░░░░░        ⇩ ⇧
 Queue  Job  Special                                        F1=Help
 LPT1Q                    1  Job[s]                                ↑
     6         PROPOSAL.TXT   11/ 1/88 14:12:32  Printing



                                                                  ↓
```
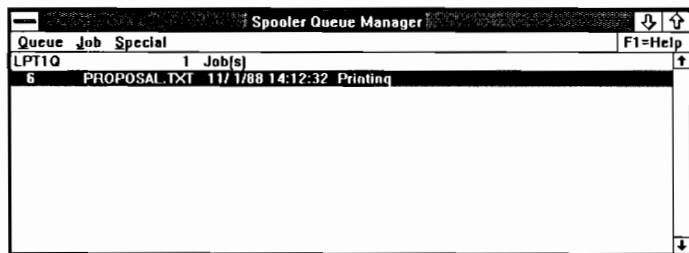
[2] Select the Job menu and choose the Cancel Job command.

A dialog box appears, asking you to confirm the cancellation.

```
┌──────────────────────────────────────┐
│          Spooler Queue Manager         │
│ Are you sure that you want to remove this │
│ job from the spool queue?              │
│  ┌──────┐   ┌──────┐                  │
│  │ Yes  │   │ No   │                  │
│  └──────┘   └──────┘                  │
└──────────────────────────────────────┘
```
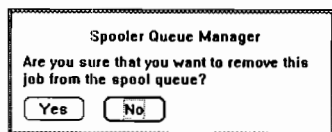
[3] Choose the Yes button to cancel the print job.

■ You can cancel all print jobs in a print queue by doing the following:

[1] Select the queue name in the Spooler Queue Manager work area.

[2] Select the Queue menu and choose the Cancel All Jobs command.

A dialog box appears, asking you to confirm that you want all the jobs removed from the queue.

```
┌─────────────────────────────────────────┐
│          Spooler Queue Manager           │
│                                          │
│  Are you sure that you want to remove all the │
│  jobs from this queue?                   │
│   ┌──────┐      ┌──────┐                 │
│   │ Yes  │      │ No   │                 │
│   └──────┘      └──────┘                 │
└─────────────────────────────────────────┘
```
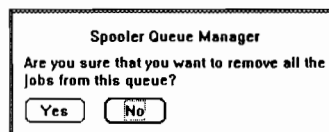
[3] Choose the Yes button to cancel the print jobs.

Moving a Print Job in the Print Queue

You can prioritize a particular print job so that it prints ahead of other jobs in the queue by using the Print Job Next command on the Job menu. The file is printed as soon as the printer becomes available.

To move a print job to the top of the queue, follow these steps:
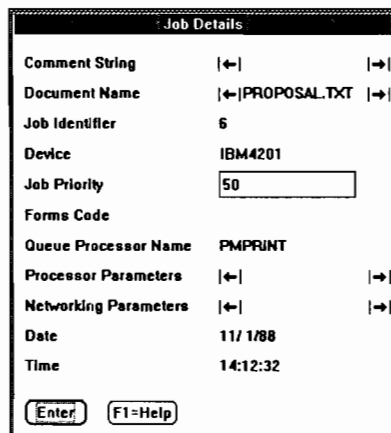
[1] Select the print job in the Spooler Queue Manager work area.

[2] Select the Job menu and choose the Print Job Next command.

The priority of the print job is set to 99—the highest priority.

You can also change the priority of a print job by using the Job Details command on the Job menu. The priority of a print job is represented by a number from 1 through 99; the default is 50 (the higher the number, the sooner the job is printed).

To change the priority of a print job, do the following:

1. Select the print job in the Spooler Queue Manager work area.
2. Select the Job menu and choose the Job Details command.

   The Job Details dialog box appears, displaying information on the job.

```
┌──────────────────────────────────────────────┐
│                  : Job Details                 │
├──────────────────────────────────────────────┤
│  Comment String          |←|              |→| │
│  Document Name           |←|PROPOSAL.TXT |→|  │
│  Job Identifier          6                     │
│  Device                  IBM4201               │
│  Job Priority            ┌──────────────────┐  │
│                          │50                │  │
│                          └──────────────────┘  │
│  Forms Code                                    │
│  Queue Processor Name    PMPRINT              │
│  Processor Parameters    |←|              |→| │
│  Networking Parameters   |←|              |→| │
│  Date                    11/ 1/88             │
│  Time                    14:12:32             │
│  ┌───────┐  ┌────────┐                        │
│  │ Enter │  │F1=Help │                        │
│  └───────┘  └────────┘                        │
└──────────────────────────────────────────────┘
```

3. Move to the Job Priority box and select the current priority; type a new priority—a number from 1 through 99.
4. Choose the Enter button.

Files are printed in the order of their priority. If print jobs share the same priority, they are printed in the order they appear in the Spooler Queue Manager work area.

Repeating a Print Job

You can print a file more than once by using the Repeat Job command on the Job menu.

Follow these steps to use the Repeat Job command:

1. Select the print job in the Spooler Queue Manager work area.
2. Select the Job menu and choose the Repeat Job command.

Starting a Print Job Over

Sometimes you may want to stop and restart a print job that is currently printing; for example, when you have problems with your printer. You can restart a job by using the Start Job Again command on the Job menu. Spooler Queue Manager stops and restarts the job.

To start a print job over, follow these steps:

1. In the Spooler Queue Manager work area, select the print job you want to start over. The job must currently be printing. The status information for the print job in Spooler Queue Manager must be "Printing."
2. Select the Job menu and choose the Start Job Again command.

Holding a Print Job

You can temporarily prevent print jobs from printing by using the Hold Job command on the Job menu. The print job is held until you release it by using the Release Job command.

To use the Hold Job command, do the following:

1. In the Spooler Queue Manager work area, select the print job you want held.
2. Select the Job menu and choose the Hold Job command.

```
Job
  Job details...
  Cancel job

  Print job next
  Repeat job
  Start job again

  Hold job
  Release job
```
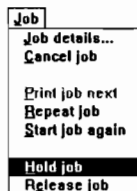
To release a job, follow these steps:

1 In the Spooler Queue Manager work area, select the print job that is held.

2 Select the Job menu and choose the Release Job command.

```
Job
  Job details...
  Cancel job

  Print Job next
  Repeat job
  Start job again

  Hold job
  Release job
```
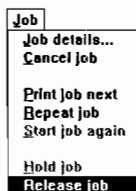
You can temporarily prevent all jobs from printing by using the Hold All Jobs command on the Queue menu. Follow these steps:

1 In the Spooler Queue Manager work area, select the print queue that contains the jobs you want held.

```
                          Spooler Queue Manager
Queue  Job  Special                                        F1=Help
LPT1Q            2  Job(s)
  8      REPORT.TXT    11/ 1/88 14:22:06  Printing
  9      SUMMARY.TXT   11/ 1/88 14:22:15
```
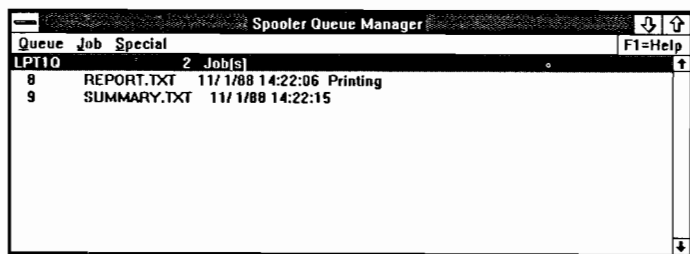
2 Select the Queue menu and choose the Hold All Jobs command.

▧▧▧▧ To release all print jobs held in a queue, you can use the Release All
Jobs command by doing the following:

1 In the Spooler Queue Manager work area, select the print queue
that contains the jobs you want to release.

2 Select the Queue menu and choose the Release All Jobs command.

Updating Spooler Queue Manager Information

The information in the Spooler Queue Manager work area is always
changing as print jobs finish and new print jobs are started. Two com-
mands on the Special menu can be used to keep this information
current.

```
Special
  Refresh  F5
✓ Auto refresh
```
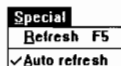
The Auto Refresh command automatically updates the listings in the
Spooler Queue Manager work area each time information changes. This
command is in effect by default and a check mark appears by its name
on the Special menu.

▧▧▧▧ You can turn the Auto Refresh command on and off by doing the
following:

▶ Select the Special menu and choose the Auto Refresh command.

If the Auto Refresh command is not in effect, you can update print-job
information in the Spooler Queue Manager work area by using the
Refresh command.

▧▧▧▧ To use the Refresh command, do the following:

▶ Select the Special menu and choose the Refresh command.

Setting Up a Printer with Control Panel

You use Control Panel to change how your printer is set up, add and remove printers, and set up a default printer (if you have more than one printer installed) for your system. Control Panel also lets you change Spooler Queue Manager options such as print-queue names and printer connections.

When you set up MS OS/2, the installation program asks for information about your printer. You see these settings in Control Panel. The information in this section will help you change settings or create new ones. In many cases, the settings you create when you set up MS OS/2 are sufficient.

To start Control Panel, do the following:

[1] Move to Start Programs.

[2] Select the Group menu and choose the Utility Programs group.

[3] Choose Control Panel.

Before you use the printer commands in Control Panel, there are a few terms you should know:

- *Printer names* are names you assign to your printers. If you installed a printer when you set up MS OS/2, the printer name is PRINTER1 (the default).

- The *default printer* is the printer your files are sent to by your application. If you have more than one printer installed, you must choose a printer to be the default printer.

- *Ports* are the slots in your computer where you connect your printer. There are three printer ports (LPT1, LPT2, LPT3) and three communications ports (COM1, COM2, COM3). You connect parallel printers to printer ports and serial printers to communications ports. You connect a printer to a particular port by plugging it in or, if you are sharing a printer over a network, by assigning it to a port using a network command. If you add a printer to your system, you must use Control Panel to select the port the printer will use.

- *Printer drivers*, sometimes called device drivers, are programs that control printing and let you set options such as print quality, paper size, and direction for a particular printer. If you set up your printer when you set up MS OS/2, you installed a printer driver as well. Using Control Panel, you can change the settings for an existing printer or change or add printer drivers when you change or add printers. In order to use a printer with MS OS/2 you must install the printer driver and associate it with your printer.

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■ *Queues* are lists of files or print jobs waiting to be printed. Spooler Queue Manager maintains these queues. In order to print files, the printer must be connected to a queue. You make this connection by using Control Panel. You can change the name of a print queue or create a new name by using Control Panel.

Adding a Printer

You add a printer to your system by using Control Panel. Before you start this procedure, you should know the following information about your printer:

■ That the necessary physical connections have been made.

See your printer manual for more information on installing your printer. If you are sharing your printer over a network, see your network manual or system administrator for more information.

■ Which port your printer is connected to.

■ Which printer driver you want to use.

To add a printer, follow these steps:

[1] In Control Panel, select the Setup menu and choose the Printer Connections command.

The Printer Connections dialog box appears, displaying the printer names and printer ports.
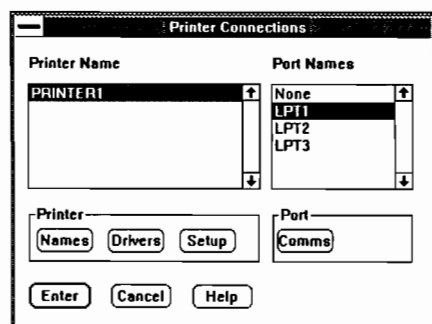
2 To create a name for a new printer, choose the Names button in the Printer section.

The Printer Names dialog box appears, displaying printer names.

```
┌────────────────────────────────────────────┐
│ ▬            Printer Names                   │
├────────────────────────────────────────────┤
│ Printer names                                │
│ ┌──────────────────────────────┬──┐         │
│ │ PRINTER1                       │▲ │         │
│ │                                ├──┤         │
│ │                                │▼ │         │
│ └──────────────────────────────┴──┘         │
│ Add/change name                              │
│ Printer name ..  [                    │]     │
│                                              │
│ Network options  [                     ]     │
│                                              │
│ (Enter) (Cancel) (Help) (Add) (Change) (Delete) │
└────────────────────────────────────────────┘
```
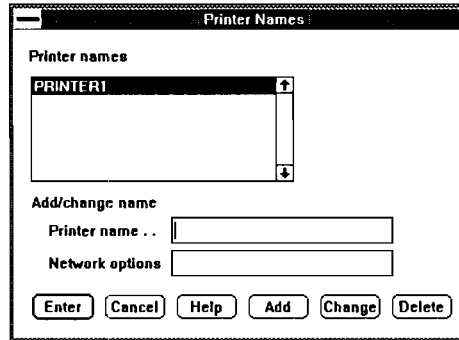
3 In the Add/Change Name text box, type the new printer name.

4 If you are using a printer over a network, type the network options you need to share the printer in the Network Options text box (see your network manual or system administrator for more information on the options you need for your particular printer).

5 Choose the Add button.

The name of the new printer appears in the Printer Names list box.

6 Choose the Enter button to return to the Printer Connections dialog box. The new printer name appears in the Printer Name list box.

New printer name

```
Printer Name
┌──────────────────────────────┬──┐
│ PRINTER1                       │▲ │
│ PRINTER2                       ├──┤
│                                │  │
│                                │▼ │
└──────────────────────────────┴──┘
```
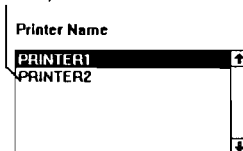
7 Select the new printer name in the Printer Name list box.

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⑧ To assign a printer driver to the new printer name, choose the Drivers button in the Printer section.

The Select Printer Drivers dialog box appears, displaying your printer in the Currently Selected Printer section. The printer-driver files appear in the Existing Device Drivers list box.

```
┌─────────────────────────────────────┐
│ ▬    ▒▒▒ Select Printer Drivers ▒▒▒  │
│ ┌─Currently selected printer───────┐ │
│ │                                  │ │
│ │  PRINTER2                        │ │
│ └──────────────────────────────────┘ │
│ ┌─Default device driver────────────┐ │
│ │                                  │ │
│ │                                  │ │
│ └──────────────────────────────────┘ │
│  Existing device drivers             │
│ ┌───────────────────────────────┬─┐ │
│ │IBM4201                         │↑│ │
│ │                                ├─┤ │
│ │                                │ │ │
│ │                                │ │ │
│ │                                ├─┤ │
│ │                                │↓│ │
│ └───────────────────────────────┴─┘ │
│  ( Enter )  ( Cancel )  ( Help )     │
└─────────────────────────────────────┘
```
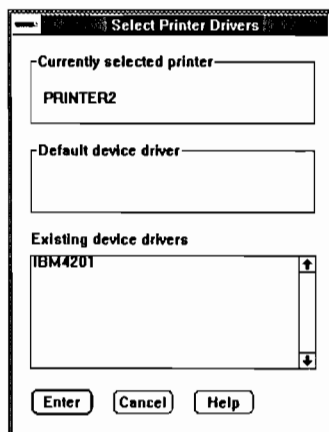
⑨ In the Existing Device Drivers list box, select the printer driver you want to assign to the new printer (if you need to add a new printer-driver file, see "Adding and Deleting a Printer Driver," later in this chapter). The printer driver appears in the Default Device Driver box.

⑩ Choose the Enter button to return to the Printer Connections dialog box.

⑪ To set printer options for the new printer, choose the Setup button.

The Set Printer Driver Options dialog box appears, displaying the printer driver that is assigned to the printer.

```
┌─────────────────────────────────┐
│ ─      Set Printer Driver Options │
│ ┌─Currently selected printer──── │
│ │  PRINTER2                      │
│ └─────────────────────────────── │
│  Selected device driver          │
│ ┌──────────────────────────────┐▲│
│ │ IBM4201                       ││
│ │                              ▼│
│ └──────────────────────────────┘│
│  (Change)  (Cancel)  (Help)      │
└─────────────────────────────────┘
```
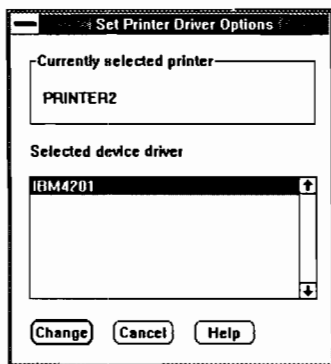
12 Choose the Change button.

A dialog box appears, displaying the current settings for your particular printer. The settings and options available vary, depending on your printer.

13 If necessary, change these settings and choose the Enter button to return to the Printer Connections dialog box.

14 To connect the new printer to a port, move to the Port Names list box.

Port Names

```
┌──────────┬─┐
│ None     │▲│
│ COM1     │ │
│ COM2     │ │
│ COM3     │ │
│ LPT1     │ │
│ LPT2     │▼│
└──────────┴─┘
```
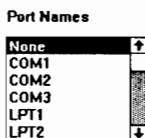
15 Select the port you want to connect your printer to.

If you connect your printer to COM1, COM2, or COM3 (a communications port), you must set additional options. See "Changing Printer-Port Connections," later in this chapter, for more information.

16 Choose the Enter button.

17 To connect the new printer to a print queue, select the Setup menu in Control Panel and choose the Queue Connections command.

The Queue Connections dialog box appears, displaying the printer names and print-queue names for your system.

```
┌──────────────────────────────────────────────────────┐
│ �— ░░░░░░░░░░░░  Queue Connections ░░░░░░░░░░░░░░░░░░░░  │
│                                                        │
│ Printer names                                          │
│                                                        │
│ ┌──────────────────────────┬─┐  ┌─Default──────────┐   │
│ │ PRINTER1               │↑│  │                  │   │
│ │ PRINTER2                 │ │  │ LPT1Q            │   │
│ │                          │ │  │                  │   │
│ │                          │ │  └──────────────────┘   │
│ │                          │ │                          │
│ │                          │ │  Queue names             │
│ │                          │ │                          │
│ │                          │ │  ┌────────────────┬─┐    │
│ │                          │ │  │ LPT1Q       │↑│    │
│ │                          │ │  │                │ │    │
│ │                          │↓│  │                │↓│    │
│ └──────────────────────────┴─┘  └────────────────┴─┘    │
│                                                        │
│  ( Enter )  ( Cancel )  ( Help )                       │
└──────────────────────────────────────────────────────┘
```
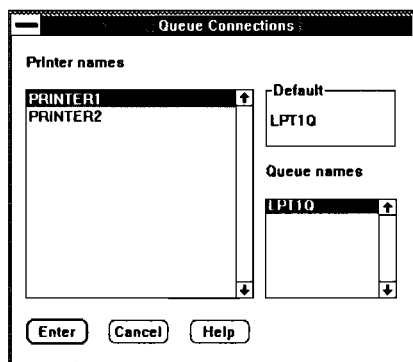
18 In the Printer Names list box, select the new printer name.

19 Move to the Queue Names list box and select the print queue you want to use with your new printer. The queue name appears in the Default box.

20 Choose the Enter button.

21 To use the new printer, you must first select it as the default printer for your system. Select the Setup menu and choose the Printer Defaults command.

The Printer Defaults dialog box appears, displaying the default printer.

Default printer

```
┌────────────────────────────────────┐
│ ▬▬▬▬▬▬▬ Printer Defaults ▬▬▬▬▬      │
│ Default printer                     │
│ ┌──────────────────────────┬───┐   │
│ │PRINTER1      °           │ ↑ │   │
│ │PRINTER2                  │   │   │
│ │                          │   │   │
│ │                          │ ↓ │   │
│ └──────────────────────────┴───┘   │
│                                     │
│ Printer timeouts (seconds)          │
│ Device not selected  ┌────┐         │
│                      │ 15 │         │
│                      └────┘         │
│ Transmission retry   ┌────┐         │
│                      │ 45 │         │
│                      └────┘         │
│ ( Enter )  ( Cancel )  ( Help )     │
└────────────────────────────────────┘
```
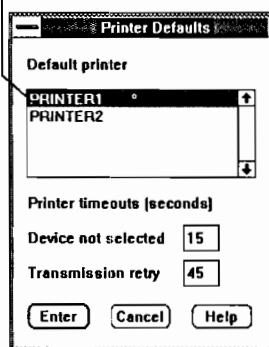
22. Select your new printer in the Default Printer list box.
23. Choose the Enter button.

Deleting a Printer

You can delete a printer by deleting the printer name using Control Panel.

To delete a printer, do the following:

1. In Control Panel, select the Setup menu and choose the Printer Connections command.
2. Choose the Names button.

   A dialog box appears, listing your printers.
3. In the Printer Names list box, select the printer you want to remove, and then choose the Delete button.

A dialog box appears, asking you to confirm deleting the printer.

```
┌──────────── Control Panel ────────────┐
│                                        │
│  Are you sure that you want to delete  │
│  PRINTER2? If you select YES, the name is │
│  erased from the list and all the information │
│  associated with that name is lost.    │
│                                        │
│   ┌─────┐      ┌─────┐                 │
│   │ Yes │      │ No  │                 │
│   └─────┘      └─────┘                 │
└────────────────────────────────────────┘
```
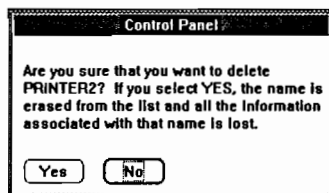
4 To remove the printer, choose Yes.

5 Choose the Enter button.

The Printer Names dialog box closes and the Printer Connections dialog box appears again.

6 Choose the Enter button.

Adding and Deleting a Printer Driver

Printer-driver files, sometimes called device drivers, are programs that control how your printer prints. These files are copied to your hard disk when you install MS OS/2. You can use the Add Printer Driver command to add additional printer drivers.

To add a printer driver, follow these steps:

1 In Control Panel, select the Installation menu and choose the Add Printer Driver command.

The Add Printer Driver dialog box appears, asking you to insert in drive A the disk that contains the printer-driver files.

```
┌───────── Add Printer Driver ──────────┐
│                                        │
│  Insert the disk with the Printer file │
│  you wish to add into drive A, or      │
│  choose an alternative drive/directory │
│                                        │
│  ┌──────────────────────────────────┐ │
│  │ A:\                              │ │
│  └──────────────────────────────────┘ │
│                                        │
│  ┌───────┐  ┌────────┐  ┌──────┐      │
│  │ Enter │  │ Cancel │  │ Help │      │
│  └───────┘  └────────┘  └──────┘      │
└────────────────────────────────────────┘
```
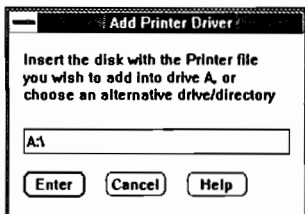
2 Insert your printer-driver disk or type the directory path for the printer-driver files (printer-driver files copied to your hard disk when you installed MS OS/2 are located in the \OS2\DLL directory).

3 Choose the Enter button.

The Add Printer Driver dialog box appears, displaying the printer-driver files.

4 Select the printer driver you want in the Printer Drivers list box. The name of the printer driver you select appears in the Printer Driver File section.

5 Choose the Add button.

6 If the printer-driver file is already copied to your hard disk, a message appears, asking you if you want to replace the existing file. Choose the Yes button to replace the existing file; choose the No button to add the printer driver without replacing any files.

You delete a printer-driver file by using the Delete Printer Driver command on the Installation menu. Follow these steps:

1 In Control Panel, select the Installation menu and choose the Delete Printer Driver command.

The Delete Printer Driver dialog box appears, displaying the printer drivers installed on your system.
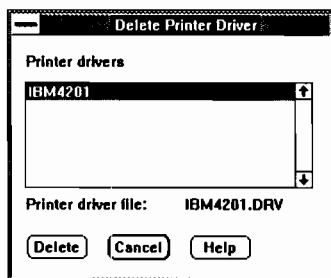
2 In the Printer Drivers list box, select the printer driver you want to delete.

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③ Choose the Delete button.

A dialog box appears, asking you to confirm deleting the printer driver.

```
┌──────────────────────────────────┐
│         ▪ Control Panel          │
├──────────────────────────────────┤
│ Are you sure that you want to delete │
│ IBM4201?                         │
│  ┌─────┐   ┌─────┐               │
│  │ Yes │   │ No  │               │
│  └─────┘   └─────┘               │
└──────────────────────────────────┘
```
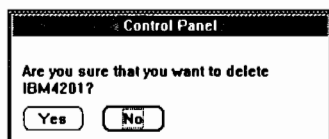
④ To delete the printer driver, choose the Yes button.

The Delete Printer Driver dialog box appears, displaying the directory path where the printer-driver file is located.

```
┌──────────────────────────────────┐
│ ▬        Delete Printer Driver    │
├──────────────────────────────────┤
│ Delete associated Printer file   │
│ IBM4201.DRV from drive/directory │
│                                  │
│ ┌──────────────────────────────┐ │
│ │ C:\OS2\DLL                   │ │
│ └──────────────────────────────┘ │
│  ┌─────┐ ┌────┐ ┌──────┐ ┌─────┐ │
│  │ Yes │ │ No │ │Cancel│ │Help │ │
│  └─────┘ └────┘ └──────┘ └─────┘ │
└──────────────────────────────────┘
```
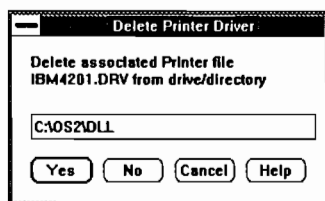
⑤ To delete the file, choose the Yes button.

Changing Printer Names

Printers are identified by name. You can change this information—add new names, delete old names, or change existing printer names—by using the Printer Connections command. If you share a printer over a network, you can provide network information, in addition to the printer name, by using this command.

To change printer names, follow these steps:

① Select the Setup menu and choose the Printer Connections command.

The Printer Connections dialog box appears, listing the printers and printer ports on your system.

[2] Choose the Names button.

The Printer Names dialog box appears, listing the printer names on your system.

```
┌──────────────────────────────────────────────┐
│ ▬                    Printer Names             │
├──────────────────────────────────────────────┤
│  Printer names                                 │
│  ┌──────────────────────────────────────┬─┐   │
│  │ PRINTER1                              │▲│   │
│  │                                       ├─┤   │
│  │                                       │ │   │
│  │                                       │ │   │
│  │                                       ├─┤   │
│  │                                       │▼│   │
│  └──────────────────────────────────────┴─┘   │
│  Add/change name                               │
│    Printer name . .  ┌──────────────────────┐  │
│                      │                      │  │
│    Network options   ┌──────────────────────┐  │
│                      │                      │  │
│  (Enter) (Cancel) (Help) ( Add ) (Change)(Delete)│
└──────────────────────────────────────────────┘
```
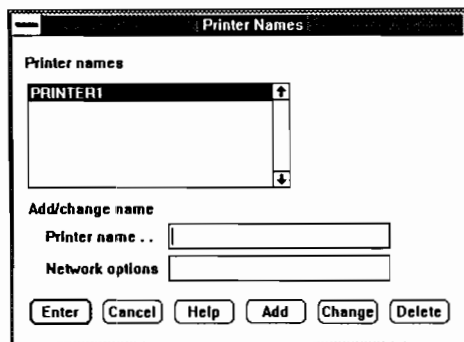
[3] To add a new printer name, type the new name in the Add/Change Name text box and choose the Add button.

[4] To change a printer name, select the name in the Printer Names list box and type the new name in the Add/Change Name text box and choose the Change button.

[5] To delete a printer name, select the name in the Printer Names list box and choose the Delete button.

[6] To add or change network options, select the name in the Printer Names list box and type the network information in the Network Options text box (see your network manual for the options you need for your printer).

[7] When you finish changing the printer-name information, choose the Enter button.

The Printer Names dialog box closes and the Printer Connections dialog box appears again.

[8] Choose the Enter button.

Changing Printer-Driver Connections

A printer driver is a program that controls printing for a particular printer. If you added a printer when you installed MS OS/2, the printer-driver file was copied to your hard disk and connected to PRINTER1 (the default). After you add a printer driver to your system, you must connect it to a printer name.

You create or change printer-driver connections by using the Printer Connections command. Follow these steps:

1. In Control Panel, select the Setup menu and choose the Printer Connections command.

   The Printer Connections dialog box appears.

2. Select the printer name you want to change drivers for in the Printer Name list box.

3. Choose the Drivers button.

   The Select Printer Drivers dialog box appears, displaying the current printer name, the default printer driver, and a list of available printer drivers.

```
┌─────────────────────────────────────┐
│ ▬     ░░░ Select Printer Drivers ░   │
│ ┌─Currently selected printer────────┐│
│ │                                   ││
│ │ PRINTER2                          ││
│ └───────────────────────────────────┘│
│ ┌─Default device driver─────────────┐│
│ │                                   ││
│ │                                   ││
│ └───────────────────────────────────┘│
│  Existing device drivers              │
│ ┌──────────────────────────────┬──┐ │
│ │IBM4201                        │ ↑│ │
│ │                               ├──┤ │
│ │                               │  │ │
│ │                               │  │ │
│ │                               ├──┤ │
│ │                               │ ↓│ │
│ └──────────────────────────────┴──┘ │
│  ( Enter )  ( Cancel )  ( Help )     │
└─────────────────────────────────────┘
```
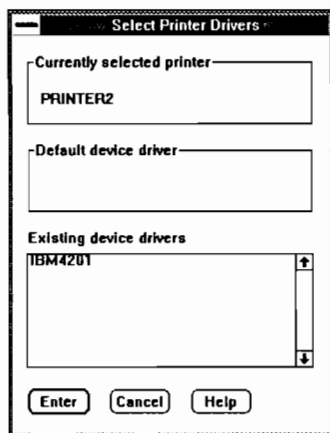
4. Select the printer driver in the Existing Device Drivers list box.

5. Choose the Enter button.

   The Select Printer Drivers dialog box closes and the Printer Connections dialog box appears again.

6. Choose the Enter button.

Setting Printer Options

You can set or change printer options such as paper size and printing quality by using the Printer Connections command on the Setup menu. Printer options vary from printer to printer.

To set printer options, do the following:

1. In Control Panel, select the Setup menu and choose the Printer Connections command.

   The Printer Connections dialog box appears.

2. In the Printer Name list box, select the printer you want.

3. Choose the Setup button.

   The Set Printer Driver Options dialog box appears.
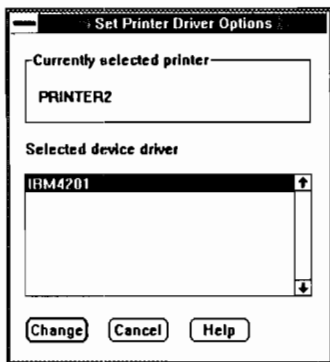
The printer you selected appears in the Currently Selected Printer box; the printer driver appears in the Selected Device Driver box.

4. Choose the Change button.

   A dialog box appears, showing the current options set for your particular printer. These settings vary, depending on the printer you have selected.

5. Change any of the settings and choose the Enter button to return to the Set Printer Driver Options dialog box.

6. Choose the Cancel button to return to the Printer Connections dialog box.

7. Choose the Enter button.

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Changing Printer-Port Connections

In order to use a printer, you must connect it to a port. You use the Printer Connections command in Control Panel to connect a printer to a port by doing the following:

[1] In Control Panel, select the Setup menu and choose the Printer Connections command.

The Printer Connections dialog box appears, displaying the names of the printers and ports installed on your system.
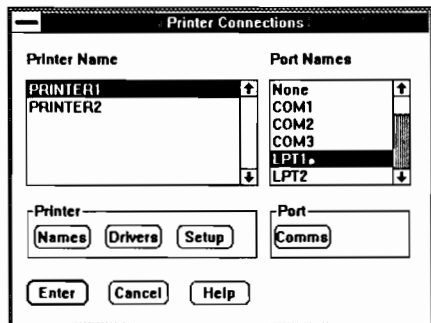
[2] In the Printer Name list box, select the printer you want to connect to a port.

When you select a printer, a port is selected in the Port Names list box. This is the port to which the printer is currently connected. If the printer is not connected to any port, None is selected in the Port Names list box.

[3] To change the port, move to the Port Names box and select the port you want to connect the printer to.

[4] Choose the Enter button.

You can connect only one printer to one port. If another printer is already connected to the selected port, a message appears. Connect one printer to None in the Port Names list box and connect the other printer to the port you want.

If you are connecting a serial printer to one of the communications ports (COM1, COM2, or COM3), you must set the options for the

port, such as baud rate and parity (see your printer manual for information on the correct settings to use). You can do this using either the Communications Port or Printer Connections command on the Setup menu.

To change serial-communications-port settings, follow these steps:

1. Select the Setup menu and choose the Printer Connections command.

   The Printer Connections dialog box appears, displaying the current printer connections.

2. Choose the Comms button.

   The Communications Port dialog box appears, displaying available serial ports and port settings.

```
┌──────────────────────────────────────────────────┐
│ ▬            Communications Port                   │
│                                                    │
│  Communications settings                           │
│                                                    │
│  Port . . .    ●[COM1]      ○ COM2      ○ COM3      │
│                                                    │
│  Baud rate    [1200]                               │
│                                                    │
│  Word length  ○ 5    ○ 6    ● 7    ○ 8             │
│                                                    │
│  Parity . .   ○ Even     ○ Odd      ● None         │
│                                                    │
│  Stop bits    ● 1        ○ 1.5      ○ 2            │
│                                                    │
│  Handshake    ○ Hardware  ● None                   │
│                                                    │
│  ( Enter )  ( Cancel )  ( Help )                   │
└──────────────────────────────────────────────────┘
```
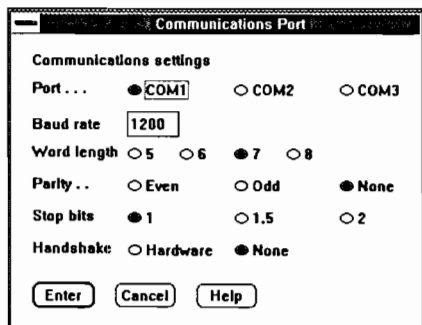
3. In the Port section, choose a port (the current settings for the port appear).
4. Select the appropriate options.
5. Choose the Enter button.

   The Printer Connections dialog box appears again.
6. Choose the Enter button.

Making changes to serial port settings is also discussed in Chapter 6, "Changing System Settings with Control Panel."

Changing Print-Queue Connections

Before you can print using Spooler Queue Manager, you must connect a printer to a print queue. You make this connection by using the Queue Connections command on the Setup menu.

To connect a printer to a print queue, follow these steps:

☐1☐ In Control Panel, select the Setup menu and choose the Queue Connections command.

The Queue Connections dialog box appears, displaying printer names and print-queue names.

```
┌─────────────────────────────────────────────┐
│ ▬  ▓▓▓▓▓ Queue Connections ▓▓▓▓▓             │
├─────────────────────────────────────────────┤
│ Printer names                                │
│ ┌────────────────────────┬─┐  ┌Default────┐  │
│ │ PRINTER1               │↑│  │           │  │
│ │ PRINTER2               │ │  │ LPT1Q     │  │
│ │                        │ │  └───────────┘  │
│ │                        │ │                 │
│ │                        │ │  Queue names    │
│ │                        │ │  ┌──────────┬─┐ │
│ │                        │ │  │ LPT1Q    │↑│ │
│ │                        │ │  │          │ │ │
│ │                        │↓│  │          │↓│ │
│ └────────────────────────┴─┘  └──────────┴─┘ │
│                                               │
│  ┌─────────┐ ┌────────┐ ┌──────┐              │
│  │ Enter   │ │ Cancel │ │ Help │              │
│  └─────────┘ └────────┘ └──────┘              │
└─────────────────────────────────────────────┘
```
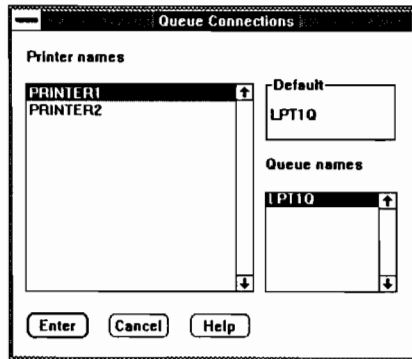
☐2☐ Select the printer you want in the Printer Names list box.

☐3☐ Move to the Queue Names list box and select the print queue you want to connect to your printer.

The print-queue name appears in the Default box.

☐4☐ Choose the Enter button.

Changing the Default Printer

When you send a file to your printer from an application or by using the **print** command, the job is sent to the default printer on your system. If you have more than one printer installed on your system, you can change the default printer by using the Printer Defaults command on the Setup menu.

To change the default printer, follow these steps:

1 In Control Panel, select the Setup menu and choose the Printer Defaults command.

The Printer Defaults dialog box appears, displaying a list of your printers. The default printer is selected.

2 Select the printer you want as your new default printer.

3 Choose the Enter button.

Using the Printer Defaults command, you can change the amount of time MS OS/2 waits before notifying you that there is a problem with a particular print job. The following settings in the Printer Timeouts section of the Printer Defaults dialog box control this waiting period:

■ The Device Not Selected setting controls the number of seconds MS OS/2 tries to send a file to a printer before reporting that the printer is off-line.

■ The Transmission Retry setting controls the number of seconds MS OS/2 waits before sending a job back to a particular printer when a problem occurs.

Both settings represent seconds and can range from 1 through 999.

To change the Printer Timeouts settings, do the following:

1 In Control Panel, select the Setup menu and choose the Printer Defaults command.

2 Move to the Device Not Selected setting and type the new setting.

3 Move to the Transmission Retry setting and type the new setting.

4 Choose the Enter button.

Changing Spooler Queue Manager Settings

You make adjustments to Spooler Queue Manager by using Control Panel commands. These commands let you start and stop Spooler Queue Manager, change its settings, or add spooler software.

Starting Spooler Queue Manager

Spooler Queue Manager starts automatically when you start MS OS/2 by turning on your computer. You can control whether it starts when you start your system by using the Spooler Options command. Using

this command, you can also change the directory where Spooler Queue Manager stores files.

If you turn off Spooler Queue Manager by using this command, it continues to run until you turn off your computer or restart it (by pressing CTRL+ALT+DEL). The next time you start your computer, Spooler Queue Manager will not start. To restart Spooler Queue Manager, use the Spooler Options command again.

To start or stop Spooler Queue Manager when you start your computer, follow these steps:

1. In Control Panel, select the Setup menu and choose the Spooler Options command.

   The Spooler Options dialog box appears, listing the directory path where Spooler files are stored.

```
┌─────────────────────────────────────┐
│ ━        Spooler Options             │
│                                      │
│ ☒ Spooler is selected                │
│                                      │
│ Spooler path │C:\SPOOL         │     │
│              └─────────────────┘     │
│  (  Enter  )  ( Cancel )  (  Help  ) │
└─────────────────────────────────────┘
```
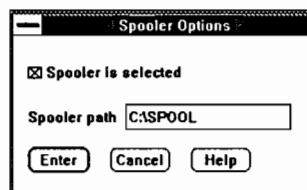
2. To turn off Spooler Queue Manager, turn off the Spooler Is Selected check box.

   To turn on Spooler Queue Manager, turn on the Spooler Is Not Selected check box.

3. To change the directory where Spooler Queue Manager files are stored, type a new directory path in the Spooler Path text box.

4. Choose the Enter button.

Changing Print Queues

Print queues are lists of files waiting to be printed. You can see what print jobs are waiting in the queue by using Spooler Queue Manager. To add, delete, or change print queues, you use the Spooler Queues command on the Setup menu in Control Panel.

When you add a print queue with Control Panel, you must also assign it a *queue processor*. A queue processor is the program that prepares a file before sending it to your printer. Queue processors are installed on your system when you install MS OS/2. You can also change some options for these programs.

To change the print queue, follow these steps:

1 In Control Panel, select the Setup menu and choose the Spooler Queues command.

The Spooler Queues dialog box appears, displaying the existing queue names and the queue processors.

```
┌────────────────────────────────────────┐
│ ▀▀    :::::::::    Spooler Queues :     │
│                                         │
│ Queue names    Queue processor names    │
│ ┌──────────┬─┐  ┌─────────────────────┬─┐ │
│ │ LPT1Q    │↑│  │ PMPRINT            │↑│ │
│ │          │ │  │                    │ │ │
│ │          │ │  │                    │ │ │
│ │          │↓│  │                    │↓│ │
│ └──────────┴─┘  └─────────────────────┴─┘ │
│                                         │
│  (Enter) (Cancel) (Help) (Names) (Setup)│
└────────────────────────────────────────┘
```
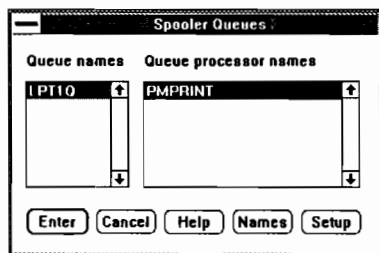
2 To add, delete, or change a print-queue name, choose the Names button.

The Queue Names dialog box appears, displaying the print-queue names.

```
┌────────────────────────────────────────┐
│ ▀▀    :::::::::    Queue Names :        │
│                                         │
│ Queue names                             │
│ ┌──────────┬─┐   Add/change name        │
│ │ LPT1Q    │↑│                          │
│ │          │ │   Queue name ... [      ]│
│ │          │ │                          │
│ │          │↓│   Network options [     ]│
│ └──────────┴─┘                          │
│                                         │
│  (Enter) (Cancel) (Help) (Add) (Change) (Delete)│
└────────────────────────────────────────┘
```
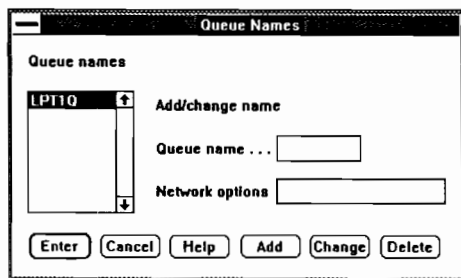
3. To add a new queue, type the new queue name in the Queue Name text box and choose the Add button.

4. To change a queue name, select the queue name in the Queue Names list box, type the new name in the Queue Name text box, and choose the Change button.

5. To delete a queue name, select the queue name in the Queue Names list box and choose the Delete button.

6. To add or change any network information for a queue, select the queue name in the Queue Names list box and type the network information in the Network Options text box (see your network manual for information on the options for your printer).

7. When you finish making changes to the queue-name information, choose the Enter button.

The Spooler Queues dialog box reappears.

8. If you add a new queue, you must assign it a queue processor. Select the queue name in the Queue Names list box and select the queue processor in the Queue Processor Names list box.

9. Choose the Enter button.

Changing Print-Queue Options

You can set print-queue options, such as how printing errors are reported, by using Control Panel. The options you can set are determined by the queue-processor program. To set options, you use the Spooler Queues command on the Setup menu.

To change print-queue options, do the following:

1. In Control Panel, select the Setup menu and choose the Spooler Queues command.

The Spooler Queues dialog box appears, displaying the print-queue names and queue processors.

```
┌──────────────────────────────────────────┐
│ ─          Spooler Queues                  │
│                                            │
│ Queue names    Queue processor names       │
│ ┌──────────┬─┐  ┌─────────────────────┬─┐  │
│ │ LPT1Q    │↑│  │ PMPRINT             │↑│  │
│ │          │ │  │                     │ │  │
│ │          │ │  │                     │ │  │
│ │          │↓│  │                     │↓│  │
│ └──────────┴─┘  └─────────────────────┴─┘  │
│                                            │
│ (Enter) (Cancel) (Help) (Names) (Setup)    │
└──────────────────────────────────────────┘
```
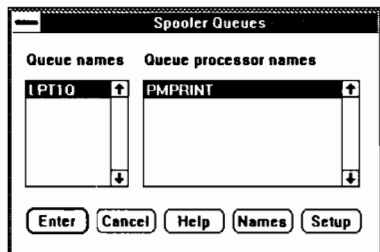
2 Select the print queue or queue processor you want to set options for.

3 Choose the Setup button.

A dialog box appears, displaying the options available for the selected queue processor.

4 Change the options you want.

5 Choose the Select button.

The Spooler Queues dialog box reappears.

6 Choose the Enter button.

Adding a Queue Processor

When you install MS OS/2, a program called a queue processor is copied to your hard disk for use by Spooler Queue Manager. Queue processors control the way files are sent to your printer. If you need to add or change the queue processor, you can use the Add Queue Processor command on the Installation menu.

To add a queue processor, follow these steps:

1 In Control Panel, select the Installation menu and choose the Add Queue Processor command.

The Add Queue Processor dialog box appears, requesting you to insert the disk that contains the queue-processor file in drive A.

```
┌────────────────────────────────────┐
│ ─        Add Queue Processor        │
├────────────────────────────────────┤
│  Insert the disk with the Queue     │
│  Processor file you wish to add into│
│  drive A, or choose an alternative  │
│  drive/directory                    │
│                                     │
│  ┌────────────────────────────────┐ │
│  │ A:\                            │ │
│  └────────────────────────────────┘ │
│  ┌───────┐ ┌────────┐ ┌──────┐      │
│  │ Enter │ │ Cancel │ │ Help │      │
│  └───────┘ └────────┘ └──────┘      │
└────────────────────────────────────┘
```
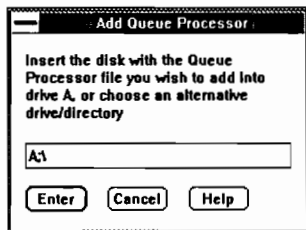
2 Insert the disk or type the directory path for the queue-processor file in the text box and choose the Enter button.

   The Add Queue Processor dialog box appears, showing the queue processors on the disk.

3 Select the queue processor you want to add and choose the Add button.

   A dialog box appears, asking you to confirm the directory to which the queue-processor file will be copied.

4 Choose the Yes button to copy the file.

You can change the directory that contains your queue-processor files, but you may need to edit your CONFIG.SYS file as well, so that Spooler Queue Manager can find the files. See Chapter 13, "Using MS OS/2 Configuration Commands," for information on changing your CONFIG.SYS file.

Deleting a Queue Processor

You can delete queue-processor files by using the Delete Queue Processor command on the Installation menu.

To delete a queue processor, follow these steps:

[1] In Control Panel, select the Installation menu and choose the Delete Queue Processor command.

The Delete Queue Processor dialog box appears, displaying the queue processors installed on your system.

```
┌─────────────────────────────────────────────┐
│ ▬        ⌄ Delete Queue Processor             │
│                                               │
│ Queue processors                              │
│ ┌───────────────────────────────────────┬─┐  │
│ │ PMPRINT                               │▲│  │
│ │                                       │ │  │
│ │                                       │ │  │
│ │                                       │ │  │
│ │                                       │▼│  │
│ └───────────────────────────────────────┴─┘  │
│ Queue processor file:    PMPRINT.QPR          │
│                                               │
│ ( Delete )  (⟦Cancel⟧)   ( Help )             │
│                                               │
└─────────────────────────────────────────────┘
```
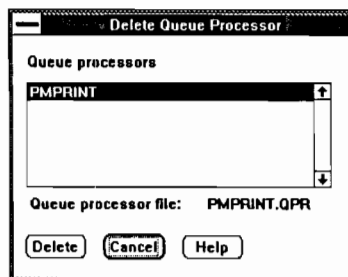
[2] Select the queue processor you want to delete.

A dialog box appears, asking you to confirm that you want to delete the queue processor.

[3] Choose the Yes button to delete the queue processor.

A dialog box appears, showing the directory path of the queue-processor file and asking you to confirm that you want to delete the file.

[4] Choose the Yes button to delete the file.

6 Changing System Settings with Control Panel

Introduction

You can adjust system settings, such as the date or screen colors in
Presentation Manager windows, by using Control Panel. Some settings,
such as the time or date, can be adjusted directly in the main Control
Panel window. Other settings, such as screen colors or baud rates for
a modem or serial printer, are set using Control Panel menus and
commands.

Starting Control Panel

To start Control Panel, do the following:

[1] Move to Start Programs.
[2] Select the Group menu and choose the Utility Programs group.
[3] Choose Control Panel.

When you start Control Panel, it creates a window that contains the
following sections:

- Time
- Date
- Cursor Blink
- Double-Click
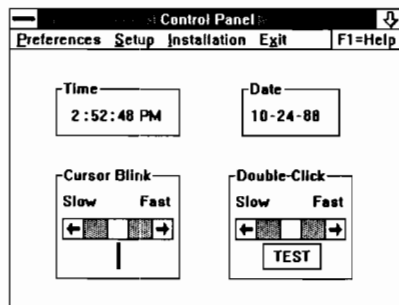
Quitting Control Panel

Once you finish adjusting your system settings, you can quit Control Panel.

To quit Control Panel, do the following:

▶ Select the Exit menu and choose the Exit Control Panel command. The Resume command on the Exit menu returns you to Control Panel.

Changing the Time

You can use Control Panel to change the system time. The time you set is reflected in any applications that use the system time. You change the time by directly adjusting settings in the Time section in the Control Panel work area.

Follow these steps to change the time by using a mouse:

[1] Click the hours, minutes, or seconds that you want to change.

```
┌─Time──────┐┌─┐
│██:53:29 AM││↑│
│           │├─┤
│           ││↓│
└───────────┘└─┘
```
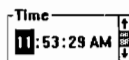
[2] Click the up arrow to increase the number or the down arrow to decrease the number.

To change the time by using the keyboard, do the following:

[1] Press TAB to move to the Time section.
[2] Press the RIGHT or LEFT key to select the part of the time (hours, minutes, or seconds) that you want to change.
[3] Press the UP key to increase the number; press the DOWN key to decrease the number.

The system time changes when you move to another section or when you quit Control Panel.

Changing the Date

Some applications use the system date to record when files are created or when changes to files occur. You change the system date in much the same way that you change the time.

If you are using a mouse, follow these steps to change the date:

[1] Click the month, day, or year that you want to change.

```
┌─Date──────┐┌─┐
│██-10-88   ││↑│
│           ├─┤
│           ││↓│
└───────────┘└─┘
```
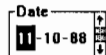
[2] Click the up arrow to increase the number; click the down arrow to decrease the number.

If you are using the keyboard, follow these steps to change the date:

1. Press TAB to move to the Date section.
2. Press the RIGHT or LEFT key to select the part of the date (month, day, or year) that you want to change.
3. Press the UP key to increase the number; press the DOWN key to decrease the number.

Changing the Cursor-Blink Rate

Some applications have a cursor or insertion point that blinks. The blink rate is the frequency at which the cursor flashes. The vertical cursor within the Cursor Blink section reflects the current setting.

To change the cursor-blink rate by using a mouse, do the following:

▶ Click the right arrow to increase the rate; click the left arrow to decrease the rate.
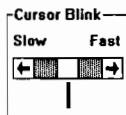
You can also change the cursor-blink rate by dragging the scroll box within the scroll bar.

Follow these steps to change the cursor-blink rate by using the keyboard:

1. Press TAB to move to the Cursor Blink section.
2. Press the RIGHT key to increase the rate; press the LEFT key to decrease the rate.

Changing the Mouse Double-Click Rate

When you double-click the mouse button, Presentation Manager interprets your action by the speed with which one click follows another. You can change this speed by adjusting the setting in the Double-Click section.

```
┌Double-Click───┐
│ Slow      Fast │
│ [←][▓  ▓][→]   │
│      [TEST]    │
└────────────────┘
```
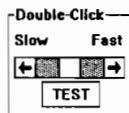
Do the following to change the mouse double-click rate:

▶ Click the right arrow to increase the rate; click the left arrow to decrease the rate.

Or

▶ Drag the scroll box within the scroll bar.

To test the new double-click setting, do the following:

▶ Double-click the Test command button.
The button color changes according to the new double-click rate.

Selecting Screen Colors

You use the Screen Colors command on the Preferences menu to adjust the text color, background colors, and shades of gray on your screen. You can specify color, shade, and amount of color for the following screen areas:

- Screen Background
- Application Work area
- Window Background

- Window Text
- Window Static Text (for example, headings)
- Menu Bar
- Menu Text
- Active Title Bar (selected)
- Inactive Title Bar
- Title Bar Text
- Active Border
- Inactive Border
- Window Frame (the border that surrounds a window)
- Scroll Bars
- Help Background
- Help Text
- Help Highlight

You change colors by first selecting a part of the screen in the Screen Colors list box and then using the Color, Shade, and Amount scroll bars to change the color. The Color scroll bar controls the color; the shade and the intensity of the color are controlled by the other two scroll bars. After you pick a color, experiment to find the combination that you want. You can see your changes to the area you selected in the Sample box. The numbers in the Sample box represent the RGB (red, green, blue) settings respectively, from 0 to 255. The setting 0 0 0 represents no color (black); the setting 255 255 255 represents fully saturated color (white).

To change screen colors, follow these steps:

1 Select the Preferences menu and choose the Screen Colors command.

The Screen Colors dialog box appears.
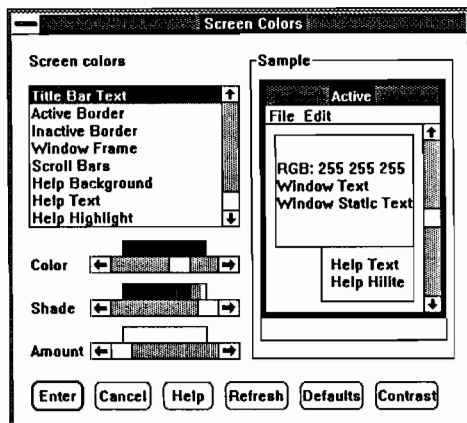
2 In the Screen Colors list box, select the part of the screen or window you want to adjust.

3 To change the color, move to the Color scroll bar. Available colors are shown in the color palette above the scroll bar. Scroll to the right or to the left to choose a color.

4 To change the brightness, move to the Shade scroll bar and scroll to the right to brighten the color (increase the amount of white); scroll to the left to darken the color.

If the Shade scroll box is at the extreme left of the scroll bar, the color is black. If the scroll box is at the extreme right, the color is white.

5 To change the amount of color, move to the Amount scroll bar and scroll to the right for a more vibrant, intense color; scroll to the left for less intensity.

If the Amount scroll box is at the extreme left of the scroll bar, adjustments to the Color and Shade scroll bars result in black, white, and shades of gray.

6 To return to the previous color settings, choose the Refresh button. The Screen Colors dialog box remains open.

7 To re-create Presentation Manager default color settings, choose the Defaults button. The Screen Colors dialog box remains open.

8 When you finish adjusting your screen colors, choose the Enter button.

You can also adjust the contrast on your screen by using the Screen Colors command if you have an IBM Enhanced Color Display (ECD) or compatible monitor. To adjust the contrast, follow these steps:

1 Select the Preferences menu and choose the Screen Colors command.

2 Choose the Contrast button.

The Adjust Screen Contrast dialog box appears.

3 Turn the contrast button on your monitor until the dark and light bands of color appear equally bright.

4 When you finish adjusting the contrast, choose the Cancel button.

Changing the Window Border Width

You can adjust the width of window borders using the Border Width command on the Preferences menu. However, you cannot change the width of a fixed-size window, such as the Control Panel window.

To change the border width, follow these steps:

1 Select the Preferences menu and choose the Border Width command.

The Border Width dialog box appears.

```
┌─────────────────────────────┐
│ ▬        Border Width        │
├─────────────────────────────┤
│  Border width (1-50) │ 4 │   │
│                             │
│  (Enter)  (Cancel)  (Help)  │
└─────────────────────────────┘
```
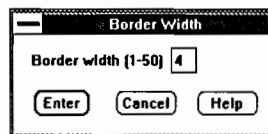
2. The Border Width dialog box displays the current width. To change the width, type a new number from 1 through 50. The larger the number, the wider the border.

3. Choose the Enter button.

Turning Off the Warning Beep

When you use MS OS/2, your computer may make a beeping sound; for example, when you press the wrong key. You can turn off the beep by using the Warning Beep command on the Preferences menu.

You can tell if the beep feature is turned on by looking at the Preferences menu. A check mark appears next to the Warning Beep command.

```
Preferences
 Screen colors...
 Border width...
✓Warning beep
 Mouse...
 Logo display...
 Country...
```
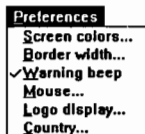
To turn the beep on or off, do the following:

▶ Select the Preferences menu and choose the Warning Beep command.

Changing Mouse Options

The Mouse command in the Preferences menu lets you change which mouse button you press. Presentation Manager generally uses only the left mouse button. You can switch usage from the left mouse button to the right mouse button (and vice versa).

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■■■■ Follow these steps to switch mouse buttons:

1 Select the Preferences menu and choose the Mouse command.
The Mouse dialog box appears.

```
┌─────────────────────────────────┐
│ ━━  ▬▬▬▬▬▬ Mouse ▬▬▬▬▬▬          │
├─────────────────────────────────┤
│ Mouse options                    │
│ ☐ Swap left/right mouse buttons  │
│                                  │
│ ( Enter )  (Cancel)  ( Help )    │
└─────────────────────────────────┘
```
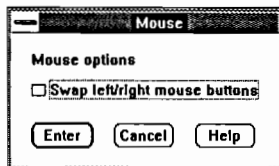
2 Turn on the Swap Left/Right Mouse Buttons check box.
3 Choose the Enter button.

If you switch mouse buttons, applications that normally use the right
button to carry out tasks will use the left button.

Adjusting the Logo Display Time

When you start some Presentation Manager applications, a logo appears
before the application screen appears. You control how long a logo
is displayed by using the Logo Display command. The choices are
to display the logo until you press ENTER, to display the logo for a
specified number of milliseconds, or not to display the logo.

▓▒░ To change the logo display time, do the following:

[1] Select the Preferences menu and choose the Logo Display command.

The Logo Display dialog box appears.

```
┌─────────────────────────────────┐
│ ▬        Logo Display           │
├─────────────────────────────────┤
│ ● Indefinite                    │
│ ○ None                          │
│ ○ Timed .. [        ] milliseconds │
│                                 │
│ ( Enter )  ( Cancel )  ( Help ) │
└─────────────────────────────────┘
```
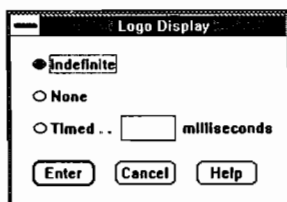
[2] Select the logo display option you want: Indefinite displays the logo until you press ENTER; None eliminates the logo display; Timed displays the logo for the number of milliseconds you type in the Milliseconds box. You can type a number from 1 through 32767.

[3] To save your changes, choose the Enter button.

Changing Country Settings

You can set variables (such as date, number, and time formats) for a particular country by using the Country command on the Preferences menu. You can use the predefined settings for each country, modify the existing country settings, or create a special set of settings for your own use.

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▓▓▓▓ To change the country-settings information, follow these steps:

① Select the Preferences menu and choose the Country command. The Country dialog box appears.

```
┌────────────────────────────────────────────────────────────┐
│ ▬                          Country                           │
├────────────────────────────────────────────────────────────┤
│ Country settings                                             │
│ ┌──────────────────────┐  ┌─Time format───────────────────┐ │
│ │ Norway             ↑ │  │ ● 12 hours  11:59 [AM]  23:59 [PM]│
│ │ Portugal             │  │                               │ │
│ │ Simplified Chinese   │  │ ○ 24 hours  Separator [:]     │ │
│ │ Spain                │  └───────────────────────────────┘ │
│ │ Sweden               │  ┌─Number format─────────────────┐ │
│ │ Switzerland          │  │                               │ │
│ │ Traditional Chinese  │  │ 1000    [,]   Decimal digits [2]│
│ │ United Kingdom       │  │                               │ │
│ │ U.S.A.               │  │ Decimal [.]                   │ │
│ │ Other country      ↓ │  │                               │ │
│ └──────────────────────┘  │ List    [,]   ☐ Leading zero  │ │
│ ┌─Date format──────────┐  └───────────────────────────────┘ │
│ │                      │  ┌─Currency format───────────────┐ │
│ │ ● MDY  ○ DMY  ○ YMD  │  │                               │ │
│ │                      │  │ Symbol [$]  ● Prefix  ○ Suffix │ │
│ │ Separator [-]        │  │                               │ │
│ └──────────────────────┘  └───────────────────────────────┘ │
│                                                              │
│  ( Enter )   ( Cancel )   ( Help )    ( Reset )              │
└────────────────────────────────────────────────────────────┘
```
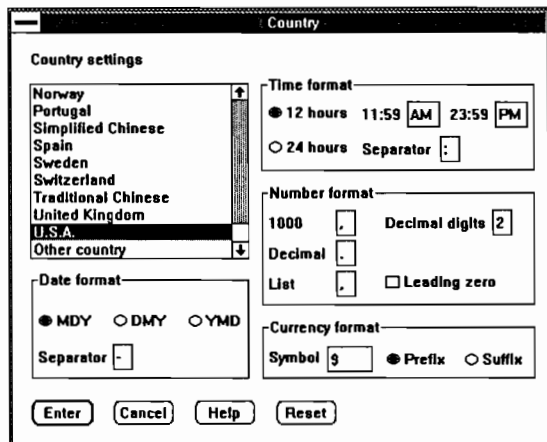
② In the Country Settings list box, select the appropriate country name. To create a new setting, select Other Country.

The country settings automatically change to correspond to the country you select.

③ Make changes to any of the settings you want.

For more information on completing the Country dialog box, see the list following this procedure.

④ If you want to return to the original settings, choose the Reset button. The Country dialog box remains open.

⑤ To save your new country settings, choose the Enter button.

The following list explains the various sections in the Country dialog box:

- The Country Settings section contains a list of available country names.

  The Other Country entry is used to create your own set of country settings.
- The Date Format section controls how dates are displayed.

```
┌─Date format──────────────────┐
│                              │
│ ● MDY    ○ DMY    ○ YMD      │
│                              │
│ Separator [.]                │
└──────────────────────────────┘
```

You can choose one of three options: month–day–year (MDY); day–month–year (DMY); or year–month–day (YMD). The Separator text box shows the symbol used to separate the day, month, and year; for example, a slash (/) or a period (.).

- The Time Format section contains two options: a 12-hour-clock option and a 24-hour-clock option.

```
┌─Time format──────────────────────────┐
│                                       │
│ ● 12 hours   11:59 [AM]   23:59 [PM]  │
│                                       │
│ ○ 24 hours   Separator [:]            │
└───────────────────────────────────────┘
```

If the country you choose uses a 12-hour clock, "AM" and "PM" appear in the text box. The Separator text box shows the symbol used to separate hours and minutes; for example, a colon (:).

- The Number Format section controls how numbers are displayed.

```
┌─Number format─────────────────────┐
│                                   │
│ 1000     [,]    Decimal digits [2]│
│                                   │
│ Decimal  [.]                      │
│                                   │
│ List     [,]    □ Leading zero    │
└────────────────────────────────────┘
```

The 1000 box shows the symbol used to separate the "1" from the "000"; for example, a comma (,). The Decimal text box contains the

symbol used to separate integers from decimals; for example, a period (.). The List text box contains the symbol used to separate lists of numbers. In the Decimal Digits box, the number of decimal digits is displayed. If the Leading Zero check box is turned on, a zero is displayed for numbers less than 1; for example, 0.59.

■ The Currency Format section controls the currency symbol and its location in relation to a number: as a prefix or a suffix.

```
┌Currency format──────────────────
│
│ Symbol  9        ● Prefix   ○ Suffix
```

Setting Up a Communications Port

You use the Communications Port command on the Setup menu to set up a serial communications port for a communications device, such as a modem or a serial printer.

Note If you are setting up a serial printer, check your printer manual to make sure that the port settings you select are correct.

To set up a communications port, follow these steps:

[1] Select the Setup menu and choose the Communications Port command.

The Communications Port dialog box appears.

```
┌─────────────────────────────────────────────┐
│ ▬         Communications Port                 │
├─────────────────────────────────────────────┤
│ Communications settings                        │
│ Port . . .    ● COM1      ○ COM2      ○ COM3    │
│                                                 │
│ Baud rate    │ 1200 │                          │
│                                                 │
│ Word length  ○ 5   ○ 6    ● 7   ○ 8            │
│                                                 │
│ Parity . .   ○ Even       ○ Odd      ● None     │
│                                                 │
│ Stop bits    ● 1          ○ 1.5      ○ 2        │
│                                                 │
│ Handshake    ○ Hardware   ● None                │
│                                                 │
│  [ Enter ]   [ Cancel ]   [ Help ]             │
└─────────────────────────────────────────────┘
```

2 Select a port.

The settings for that port appear.

3 Select the options you want.

For more information on completing the Communications Port dialog box, see the list following this procedure.

4 Choose the Enter button.

The following list explains the various sections of the Communications Port dialog box:

- The Port section connects a communication device to one of three ports: COM1, COM2, or COM3.
- The Baud Rate section controls the speed at which information is sent and received. Examples of baud rates include 1200, 1800, 2400, and 7200.
- The Word Length section controls the number of bits used in sending individual characters.
- The Parity section sets how your communication device checks for errors in sending and receiving information. If your device checks for parity, select the Even or Odd option where appropriate; if it does not check for parity, select the None option.
- The Stop Bits section controls end-character signals.
- The Handshake section controls how a communication device signals the beginning and end of a transmission.

For information on the settings for your particular device, see your owner's manual.

Adding a Font File

Applications use fonts and typefaces for displaying text on your screen and for printing. These fonts are contained in font files; one font file may contain several fonts. For example, the font file TIMES.FON contains fonts for Times Roman, Times Roman Bold, and Times Roman Italic, among others. To add a new font for use with your printer, you must copy the font file and add the individual font using the Add Font command in Control Panel. Font files copied to your hard disk when you installed MS OS/2 are located in the \OS2\DLL directory.

☞ To add a font, follow these steps:

[1] Select the Installation menu and choose the Add Font command.

The Add New Font dialog box appears, asking you to insert in drive A the disk that contains the font file.

```
┌──────────────────────────────────────┐
│ ▬▬▬▬▬▬▬▬▬ Add New Font ▬▬▬▬▬▬▬▬       │
├──────────────────────────────────────┤
│ Insert the disk with the Font file you │
│ wish to add into drive A, or choose    │
│ an alternative drive/directory         │
│                                        │
│ ┌──────────────────────────────────┐  │
│ │ A:\                               │  │
│ └──────────────────────────────────┘  │
│                                        │
│  ( Enter )   ( Cancel )   ( Help )     │
│                                        │
└──────────────────────────────────────┘
```
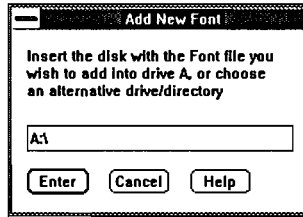
[2] Insert the font-file disk in the disk drive and choose the Enter button.

The Add New Font dialog box appears, displaying the font files and font names on the disk. Each font file contains several fonts.

[3] In the Font Files list box, select the font file that contains the font you want to add.

Fonts contained in the font file appear in the Font Names list box.

[4] In the Font Names list box, select the font you want to add. You must add each font separately.

[5] To add a font, choose the Add button.

The Add New Font dialog box appears, showing where the font file will be copied.

[6] Choose the Yes button to copy the font file. If you do not want to copy the font file, choose the No button.

You do not need to copy font files that were copied to your hard disk when you installed MS OS/2. If the file has already been copied to your hard disk, Control Panel displays a warning message before copying the file.

If you change the directory to which the font files are copied, you may also have to edit your CONFIG.SYS file. See Chapter 13, "Using MS OS/2 Configuration Commands," for more information on changing this file.

Deleting a Font File

You can remove fonts by using the Delete Font command. Since font files contain several fonts, you must first remove all the fonts before you can delete the file itself.

To remove a font, follow these steps:

[1] Select the Installation menu and choose the Delete Font command. The Delete Font dialog box appears, displaying the font files and font names on your system.

```
┌──────────────────────────────────────────────┐
│ ▬                    Delete Font               │
│                                                │
│  Font files       Font names                   │
│                                                │
│  ┌─────────┐▲  ┌────────────────────────────┐▲ │
│  │COURIER  │   │Courier                     │  │
│  │HELV     │   │Courier Bold                │  │
│  │         │   │Courier Bold Italic         │  │
│  │         │   │Courier Italic              │  │
│  │         │   │                            │  │
│  │         │   │                            │  │
│  │         │   │                            │  │
│  │         │▼  │                            │▼ │
│  └─────────┘   └────────────────────────────┘  │
│                                                │
│  ┌─────────┐ ┌─────────┐ ┌──────┐              │
│  │ Delete  │ │ Cancel  │ │ Help │              │
│  └─────────┘ └─────────┘ └──────┘              │
└──────────────────────────────────────────────┘
```
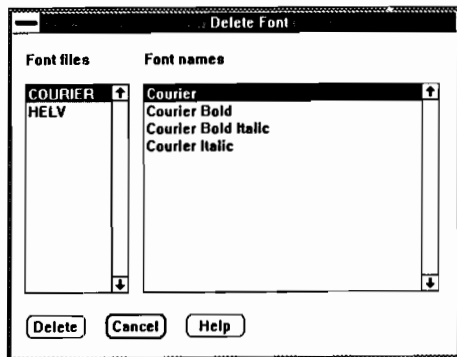
[2] In the Font Files list box, select the font file that contains the font you want to delete (font names appear in the Font Names list box).

[3] In the Font Names list box, select the font you want to delete.

[4] A dialog box appears, asking you to confirm deleting the font. Choose the Yes button to delete the font.

[5] If you remove all fonts in a font file, a dialog box appears, asking if you want to delete the font file. Choose the Yes button to delete the file.

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Part 2

Using Cmd and the DOS Session

This part of the *Microsoft Operating System/2 User's Guide* describes how to work with MS OS/2 if you prefer to work with a non-graphical command-line user interface.

You will learn how to use the MS OS/2 command interpreter, **cmd**, including how to start and stop the program and how to run **cmd** commands, start programs, and create batch programs.

MS OS/2 utilities are also explained. You can use utilities to carry out tasks with files, directories, and devices.

You will learn how to run programs in the DOS session and how to use the DOS command interpreter, **command**. Instructions are also provided for running DOS programs and MS OS/2 utilities in the DOS session.

Finally, you will learn about System Editor, a text editor that you can use to edit your files.
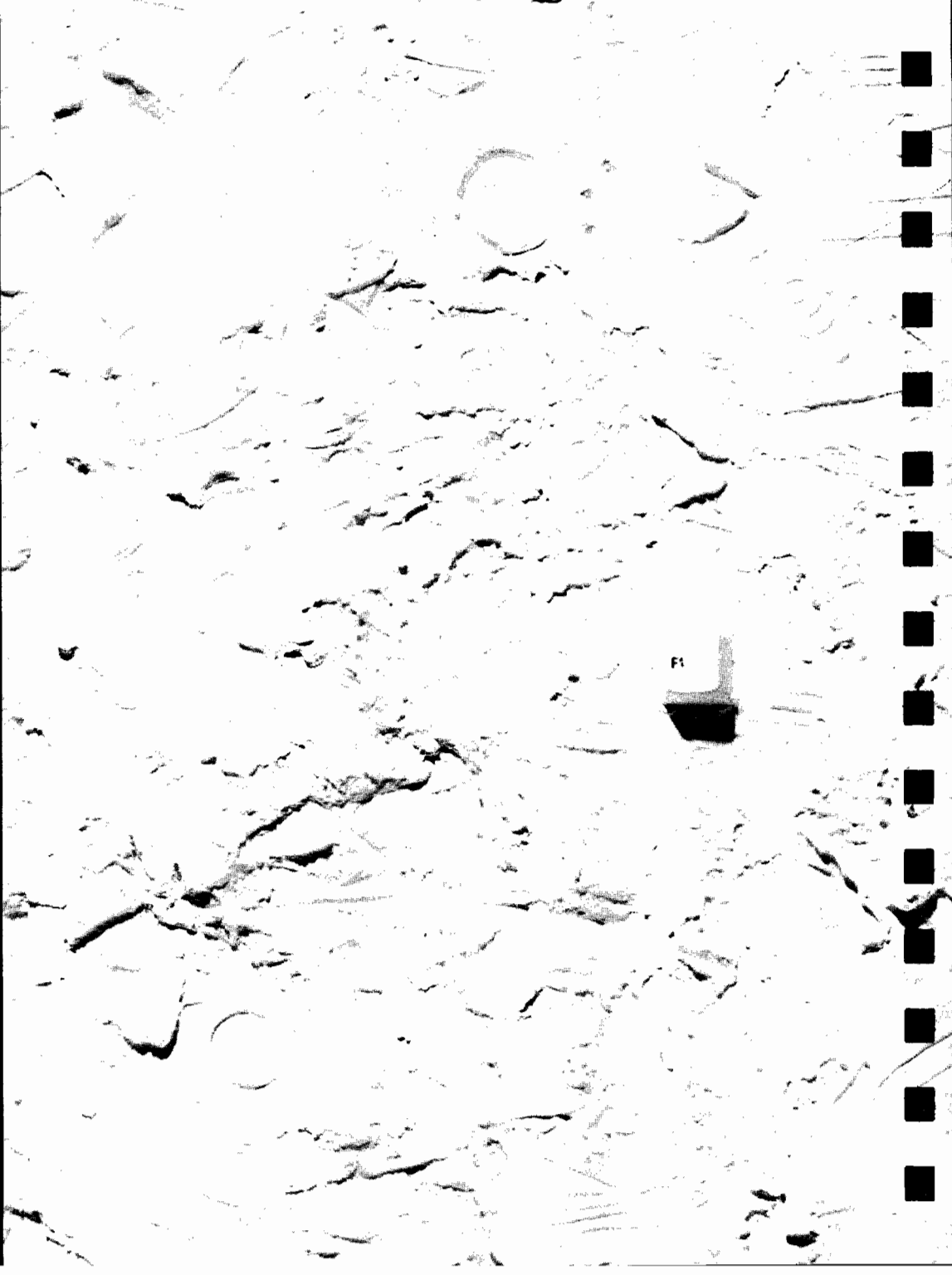
F1

Part 2

←Enter
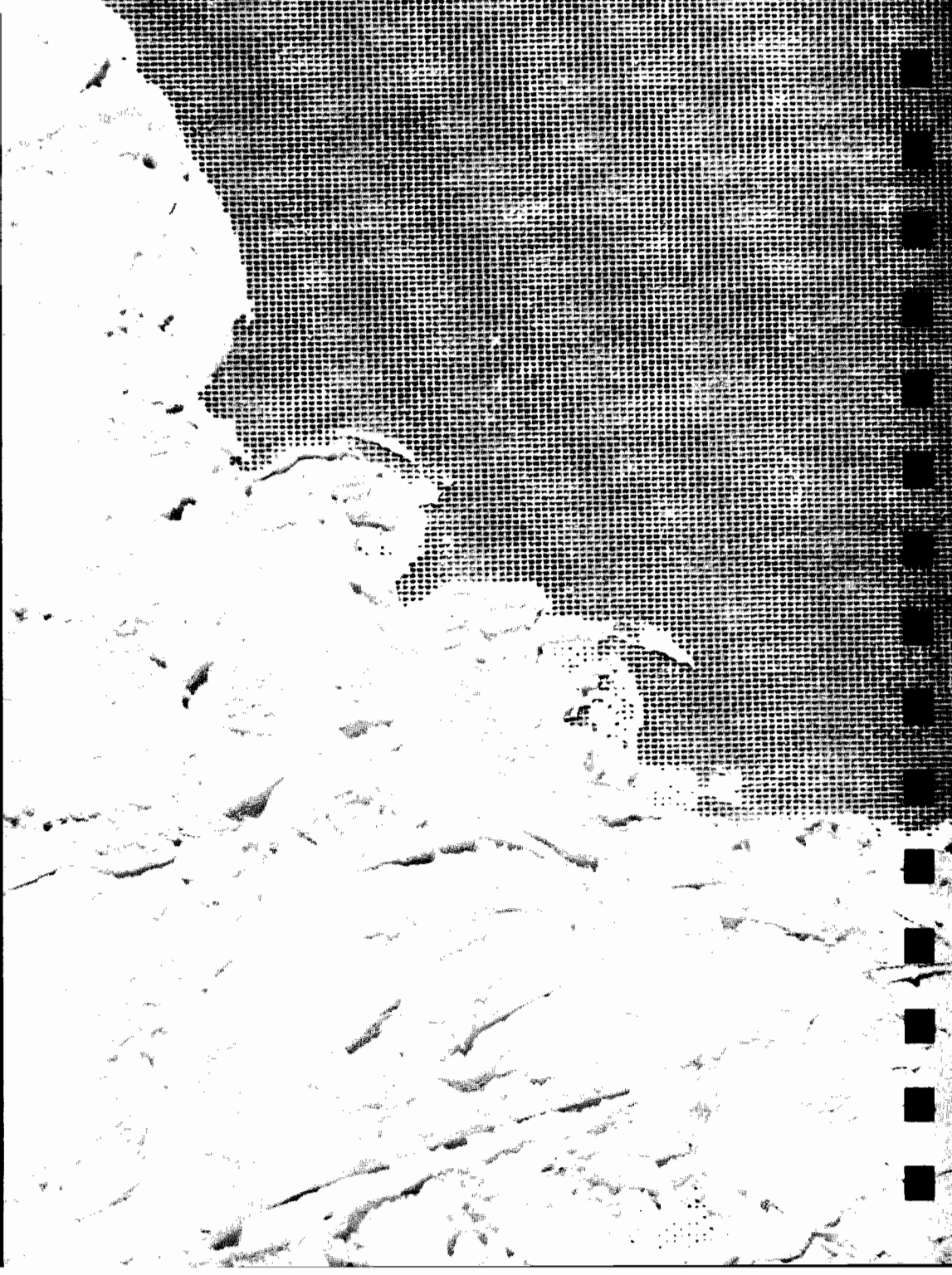
7 Running Cmd

Introduction

The MS OS/2 command interpreter, **cmd**, is a program that translates what you type at a prompt into commands that your computer can understand. When you install MS OS/2, the **cmd** prompt looks like the following:

`[c:\]`

You can run **cmd** in a full-screen OS/2 session or in a window. Instead of the Presentation Manager graphical environment, **cmd** provides a command-line interface. This means that **cmd** displays a prompt where you type commands to start other programs.

Cmd contains a set of built-in commands that help you to manage files and directories, create and run batch programs, and set system features. **Cmd** also lets you start other programs, so it provides an alternate to Start Programs if you're working in a full-screen session or if you're running **cmd** in a window.

This chapter describes how to start and quit the **cmd** program, and how to use **cmd** commands. For information about utilities that can be run from the **cmd** program, see Chapter 8, "Using MS OS/2 Utilities."

Starting and Quitting Cmd

You can start **cmd** either in a full-screen OS/2 session or in a window in the Presentation Manager session. From the Main Group in Start Programs, do one of the following:

▶ To start **cmd** in a full-screen session, choose OS/2 Full-Screen Command Prompt from the Main Group in Start Programs.

Or

▶ To start **cmd** in a window, choose OS/2 Windowed Command Prompt from the Main Group in Start Programs.

If you start **cmd** in a full-screen session, the screen clears and the **cmd** prompt appears in the full screen. If you start **cmd** in a window, a new window appears in the Presentation Manager session and the **cmd** prompt appears in the window.

Note You can also start **cmd** from File System by double-clicking the CMD.EXE file. For more information about File System, see Chapter 3, "Using File System."

To quit **cmd**, type **exit** at the prompt. If **cmd** is running in a full-screen session, Task Manager appears. If **cmd** is running in a window, the window closes and Start Programs appears.

If you want to switch from a full-screen session to Task Manager, press CTRL+ESC.

Using Commands

You can use several MS OS/2 commands to manage your files and directories. This section describes **cmd** commands and explains how to use them.

Starting Commands

After you have started **cmd**, you are ready to use commands. At the **cmd** command prompt, do the following:

▶ Type the name of the command, followed by any arguments, and press ENTER.

In addition to commands built into **cmd**, you can also start MS OS/2 utilities and other full-screen programs. To start other MS OS/2 programs, see the manual that accompanies your program, and "Running Programs," later in this chapter.

When you use **cmd** commands, you may see error messages appear on your screen. You can use the Help program to get an explanation of the error message. For more information about Help, see Chapter 8, "Using MS OS/2 Utilities."

Setting Up the System

Cmd contains several built-in commands that are useful for setting up your system. They are as follows:

Command	Purpose
cls	Clears your screen.
date	Displays and sets the system date.
time	Displays and sets the system time.
prompt	Changes the **cmd** prompt.
ver	Displays the MS OS/2 version number.
chcp	Changes the current code page.

These commands are described in the following sections.

Clearing the Screen

The **cls** command clears your computer screen. To use this command, type the following:

cls

Your screen clears, and the MS OS/2 command prompt appears in the upper-left corner of the screen.

Setting and Displaying the Date

You can set and display the system date by using the **date** command. MS OS/2 uses this date to update the directory listing whenever you create or change a file or directory. The date that you set applies to all sessions.

To use the **date** command, type the following:

date

You'll see a message like the following:

```
The current date is Fri  3-24-89
Enter the new date: (mm-dd-yy) _
```

To keep the current date, press ENTER. To change the date, type the new date at the cursor, separating the month, day, and year with hyphens (–), slashes (/), or periods (.). For example, the dates 6-1-89, 6/1/89, and 6.1.89 are equivalent.

Note If your system is set up for a country other than the United States, the date and time format you use may differ from what is shown here. The **country** command in the CONFIG.SYS file sets this format. For more information about the **country** command, see Chapter 13, "Using MS OS/2 Configuration Commands."

You can also specify the date directly after the **date** command, as follows:

date 3-1-89

Setting and Displaying the Time

You can set and display the system time with the **time** command. This command works setting the internal clock in your computer. MS OS/2 uses this time to update the directory listing whenever you create or change a file or directory. The time that you set applies to all sessions.

To use the **time** command, type the following:

time

You'll see a message like the following:

```
The current time is: 10:21:39.03
Enter the new time: _
```

To keep the current time, press ENTER. To change the time, type the new time at the cursor, separating hours, minutes, seconds, and hundredths of a second with colons (:) or periods (.). The separator between seconds and hundredths of a second must be a period. The hour is based upon a 24-hour clock. Seconds and hundredths of a second are optional.

You can also specify the time directly after the **time** command, as follows:

time 13:30

Changing the Cmd Prompt

You can change the way your prompt looks by using the **prompt** command. **Prompt** recognizes several character combinations, all of them beginning with a dollar sign ($), which display different characters in the prompt. The **prompt** command affects only the current session.

To change the prompt, type **prompt** followed by one or more character combinations. For example, to change the prompt to an equal sign followed by a greater-than sign, type the following:

prompt qg

Now your prompt looks like this:

=>

You can use any of the following character combinations to create your prompt:

Characters	Prompt
$$	Dollar sign ($)
$t	Current time
$d	Current date
$p	Current directory on the current drive
$v	Version number
$n	Default drive
$g	Greater-than sign (>)
$l	Less-than sign (<)
$b	Pipe symbol (|)
$_	New line (the equivalent of pressing ENTER)
$e	ANSI escape code
$q	Equal sign (=)
$h	Backspace (to erase a character in the prompt)
$i	Help line
$c	Left parenthesis [(] (in **cmd** only)
$f	Right parenthesis [)] (in **cmd** only)
$a	Ampersand (&) (in **cmd** only)

If you type **prompt** by itself, the prompt changes to the default system prompt.

Displaying the Version Number

To display the MS OS/2 version number, use the **ver** command. To use **ver**, type the following:

ver

Changing the Code Page

To display or switch the current code page, use the **chcp** command. This code page defines a character correspondence table that is used to set up foreign-language versions of MS OS/2. Five code pages are supported: Multilingual (850), United States (437), Portuguese (860), French-Canadian (863), and Nordic (865).

Before you can switch to a different code page, you must set up your system for code-page switching. This can be done during installation of MS OS/2. Or you can modify your CONFIG.SYS file by following the instructions found in Chapter 13, "Using MS OS/2 Configuration Commands."

To find out which code page(s) are prepared for your system, type **chcp** by itself. To switch to a different code page, type **chcp** followed by the number of the code page. For example, to switch to the French-Canadian code page, type the following:

chcp 863

For a list of countries and their supported code pages, see Chapter 13, "Using MS OS/2 Configuration Commands."

Managing Files, Directories, and Drives

MS OS/2 provides several commands that help you manage files, directories, and drives. These commands are as follows:

Command	Purpose
dir	Displays the contents of a directory.
mkdir (md)	Makes a new directory.
chdir (cd)	Switches to a different directory.
rmdir (rd)	Removes a directory.
type	Displays the contents of a file.
copy	Copies a file.
del (erase)	Deletes a file.
rename (ren)	Renames a file.
vol	Displays the volume label of the current drive.

Alternate forms of the commands are shown in parentheses.

Unless you specify otherwise, all commands that you type at the **cmd** prompt work with the contents of the current directory. Many of these commands accept options, which are letters preceded by a slash (/) that modify how a command works. While most command options are described in this chapter, see the *Microsoft Operating System/2 Desktop Reference* for a complete listing and description of the options for each command.

Displaying Directory Information

To display a listing of the contents of a directory, use the **dir** command. A directory listing consists of individual directory entries, each of which describes one file or subdirectory in that directory.

You can display the directory listing for your current directory, for a specific directory or file, for more than one directory, or for a group of files. In addition, the **dir** command can display the listing in a multiple-column format or a page-by-page format. These options are described in the following sections.

Displaying the Contents of the Current Directory

To display the contents of the current directory, type the **dir** command without any arguments.

For example, suppose that you are in a directory called FINANCE. To display the directory entries for this directory, type the following:

dir

Cmd displays a listing like the following on your screen:

```
The volume label in drive C is RALPH.
Directory of C:\FINANCE

.            <DIR>         1-30-89    9:10a
. .          <DIR>         1-30-89    9:10a
BUSINESS     <DIR>         1-30-89    9:11a
PERSONAL     <DIR>         1-30-89    9:12a
TAXES        <DIR>        10-15-89    8:47a
1QUARTER SUM       452     4-20-89   10:31a
2QUARTER SUM       590     7-27-89    9:05a
3QUARTER SUM       524    10-08-89    3:54p
REPORT   TXT      1168    11-08-89    2:15p
        9 File(s)    1880064 bytes free
```

Here's what each directory entry contains:

- The volume label of your current drive
- The name of the current drive and directory
- The filename and filename extension (if any), or the directory name
- The size of the file (in bytes)
- The date that the file or directory was created or last modified
- The time that the file or directory was created or last modified

Note If your system is set up for a country other than the United States, your time and date formats may differ from what is shown here. This information is specified by the **country** configuration command in your CONFIG.SYS file. For more information about time and date formats for other countries, see Chapter 13, "Using MS OS/2 Configuration Commands."

Directories have <DIR> listed after their names. At the end of the listing, **dir** lists the number of files in the directory and the number of bytes that are free on the disk. It's a good idea to check your available disk space regularly, especially if your disk space is limited.

If you're viewing a directory listing for a directory other than the root directory, you'll see periods (. and ..) listed as directory entries. These characters are a shorthand notation for the current (.) and parent (..) directories. The current directory is the one you are now working in, and the parent directory is the directory that is one level above the current directory.

You can use this notation in any **cmd** command or utility to specify the current or parent directory. For example, to see the directory listing for a parent directory, type the following:

dir ..

You can also display directory entries for the current directory on a different drive. For example, to see what's in the current directory on drive A, type the following:

dir a:

A listing of the directories and files for drive A will appear on your screen.

Viewing a Directory Listing for a Specific Directory or File

The **dir** command lets you view any directory listing without changing your current directory.

To do this, you must tell **cmd** the path of the directory you want to view. You can specify the directory's full path from the root directory, or you can specify a relative path from your current directory. Although you can always type the full path of a directory, it's not required.

For example, suppose you have your business-travel schedules stored in the TRAVEL subdirectory of the \FINANCE\BUSINESS directory. To view the files in your TRAVEL subdirectory from the root directory, type the following:

dir \finance\business\travel

However, if you are in the FINANCE directory, you can just type the path from the current directory to the TRAVEL subdirectory:

dir business\travel

If you prefer to see your personal-travel schedules, stored in the TRAVEL subdirectory of the \FINANCE\PERSONAL directory on drive A, type the following:

dir a:\finance\personal\travel

Note If you will be doing much work in another directory, you can also use the **chdir** command to move to that directory before using the **dir** command. The **chdir** command is described in detail in "Changing to Another Directory," later in this chapter.

Displaying the Contents of More than One Directory

You can display directory listings for more than one directory by typing the name of each directory after the **dir** command.

For example, suppose that you are planning to purchase new desks and lamps for your employees. Although you have price lists for many items in your current directory, you would like to see the directory listings that pertain only to desks and lamps. To see the directory listings for the DESKS subdirectory, which is on your current drive, and to see the directory listing for the LAMPS directory, which is on drive A, type the following:

dir desks a:\lamps

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You will first see the directory listing for DESKS, followed by the listing for LAMPS:

```
The volume label in drive C is RALPH.
Directory of C:\DESKS

.                <DIR>       6-23-89    2:58p
..               <DIR>       6-23-89    2:58p
STUDY    DSK       899       6-09-89   12:35p
TOOLS    DSK      3821       2-02-89    1:41p
WORK     DSK        16       3-16-89    8:40a
         3 File(s)          1646592 bytes free


The volume label in drive A is INVENTORY.
Directory of A:\LAMPS

.                <DIR>       4-28-89    6:30p
..               <DIR>       4-28-89    6:30p
DESK     LMP       240       1-09-89    1:02p
TABLE    LMP      1234       4-16-89    3:54p
SPOT     LMP        80       2-10-89    8:59a
         3 File(s)      512 bytes free
```

Displaying Directory Listings for a Group of Files

You might find that you want to view directory listings for a specific group of files. For example, to view the directory listings in your current directory for all of the files that have the filename extension .DOC, type the following:

dir *.doc

The asterisk (*) is a *wildcard character*, which has a special meaning to **cmd**. MS OS/2 wildcard characters tell **cmd** to replace the asterisks with any alphanumeric character or string of characters. In the previous example, the files REPORT.DOC, REPLY.DOC, and LETTER.DOC are all displayed.

Wildcard characters can be used with the **dir** command to specify other groups of files. For example, to view all of the files that begin with the letter "R," type the following:

dir r*

This displays the files REPORT.DOC and REPLY.DOC, but not LETTER.DOC.

To view all files beginning with the string FIN, regardless of their filename extensions, type the following:

dir fin*

The files FINANCE.TXT, FIND.TXT, and FIN024.DAT are all included in the listing.

In addition to the asterisk, the question mark (?) can also be used as a wildcard character. A question mark in a filename or filename extension means that any character can occupy that position. For example, to display directory listings for trade shows that you have attended, you could type the following:

dir show?.*

You would see a list that contains SHOW1.SEA, SHOWN.SF, and SHOW3.LA; it would, however, not include SHOW23.SEA (since the question mark stands for only one character).

Displaying a Directory Listing in Wide Format

If you have a large directory with many files, you might not be able to see all of the directory listings on one screen. One way to condense this listing is to display it in wide (/w) format.

Suppose that your ACCOUNTS directory contains files for every account you have. You want to see the names of all the accounts, but you know that it is quite a long list of names.

To display the directory listing in wide format, use the /w option on the command line:

dir accounts /w

A horizontal listing appears on your screen. You see a multiple-column listing of the filenames in the directory, but they appear without the file size or date/time information. The directory entries are listed alphabetically, from left to right.

Viewing a Directory Listing in Page Format

Just as you read a book, you can look at a directory listing a screenful, or page, at a time. To do this, use the /p option:

dir accounts /p

The first part of the directory listing is displayed, then the message "Press any key when ready . . ." appears at the bottom of the screen when the screen is full. After you press a key, the second page of the listing appears. This continues until all of the directory entries are displayed, or until you press CTRL+C to stop the operation.

You can also use the /w and /p options together. This option combination displays directory listings in wide format, one page at a time.

Creating a Directory

You can create a directory by using the **mkdir** command. You can create a directory under your current directory, or you can create a directory in a specified drive or location. The short form of the **mkdir** command is **md**.

MS OS/2 always creates the root directory (\) for you. But most users will require additional directories to store system and user files. You can create additional directories, called *subdirectories*, which branch out from the root directory into a multi-level directory structure.

Creating a Directory in the Current Directory

To make a directory in your current directory, type **mkdir** or **md** followed by the name of the new directory. For example, to create a new subdirectory named INVOICE under the FINANCE directory, go to the FINANCE directory and type the following:

md invoice

If you now type **dir**, you see INVOICE listed as a subdirectory:

```
INVOICE <DIR>    6-1-89 4:44p
```

Creating a Directory in a Specified Location

You can also make a new directory anywhere you choose. This means that even if you are in the INVOICE subdirectory on drive C, you can make a new directory named LETTERS on drive A. Just specify the drive and path of the new directory after the **mkdir** command, as follows:

md a:\letters

This creates a new directory on drive A named LETTERS.

Creating Multiple Directories

To save time, you can create more than one directory at a time. For example, to create the SUPPLIES directory as a subdirectory of your current directory, and the EXPENSES directory as a subdirectory of the root directory on drive A, type the following:

md supplies a:\expenses

This creates two directories: one on your current drive, and one on drive A.

Changing to Another Directory

If you want to work in a different directory, you can use the **chdir** command to change directories. The short form of the **chdir** command is **cd**.

To change to a subdirectory under the current directory, type **cd** followed by the name of the subdirectory. For example, to move from the FINANCE directory to the INVOICE subdirectory, type the following:

cd invoice

To change to a directory somewhere else on the directory tree, you must specify the path of the directory.

Moving to the Parent or Root Directory

You have seen how the **dir** command uses periods to list the current (.) and parent (..) directories in a directory listing. You can easily move to the current directory's parent directory by typing the following:

cd ..

Each time you type this command, you move one level towards the root directory. For example, suppose you are in the MEMOS directory, whose full path is \FINANCE\LETTERS\MEMOS. To return to the \FINANCE directory, type the following:

cd ..\..

This takes you out of the MEMOS subdirectory and moves you to the \FINANCE directory.

You can also combine the periods (..) with directory names to specify a directory. For example, suppose you're in the \LETTER\WORK directory and you want to move to the \LETTER\FAMILY directory. You could move up one level by typing **cd ..** and then type **cd family** to move down to the right directory. However, an easier way is to combine the two operations in one step as follows:

cd ..\family

To move quickly to the root directory, regardless of where you are in the directory structure, type the following:

**cd **

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Removing a Directory

The **rmdir** command removes a directory. The short form of this command is **rd**.

Before you can remove a directory, you must delete all the files in the directory. (For information on deleting, see "Deleting a File," later in this chapter.) You must also move to a directory other than the one you want to delete, since **cmd** will not let you delete a directory that you are currently in.

Note You cannot remove the root directory, and you cannot remove directories that are being used in other sessions.

Removing One Directory

To remove one directory, make sure that the directory is empty and that you are in a different directory, then type **rd** followed by the name of the directory you want to delete. For example, to delete the sub-directory LETTERS, do the following:

1. If you are in the LETTERS directory, type **cd ..** to switch to the parent directory.
2. Type **del letters*.*** to delete all the files in the directory. A message appears, asking you whether you are sure that you want to delete all files. Type **y** to delete all files in the directory.
3. Type **rd letters** to remove the directory.

Removing More than One Directory

To remove more than one directory, type the **rd** command, then specify each directory you want to delete, as follows:

rd letters travel

Make sure that each directory you want to delete is empty.

Displaying the Contents of a File

To display the contents of a file, use the **type** command. For example, suppose that you have saved a letter in a file called MEMOJAN.FIL. To view the contents of MEMOJAN.FIL, type the following:

type memojan.fil

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The contents of the file scroll on your screen:

```
TO:           John Howard
FROM:         Elizabeth Johnson
SUBJECT:      Questionnaires
DATE:         January 12, 1989

The twenty questionnaires you sent to our
department have been completed and are
enclosed in the accompanying envelope.

Thank you for encouraging us to participate
in your survey. We look forward to learning
the results!
```

If the file is large, you may want to temporarily stop the text from scrolling on your screen. To do this, press CTRL+S. To resume scrolling, press CTRL+S again.

Note   If you have a large file that you want to view, you might want to use the **more** utility instead of the **type** command. The **more** utility displays the contents of a file a screenful at a time. For information about the **more** utility, see Chapter 8, "Using MS OS/2 Utilities."

You can display more than one file at a time by adding additional filenames after the **type** command. For example, to display the files MEMOJAN.FIL and MEMOFEB.FIL, type the following:

type memojan.fil memofeb.fil

The contents of MEMOJAN.FIL appear first, followed by the contents of MEMOFEB.FIL.

You could also use wildcard characters to display several files. For example, to display the contents of all the files with the extension .FIL, one after the other, type the following:

type *.fil

You can also use redirection symbols with the **type** command. Redirection is a feature that lets you take the output from a command and send it to a file instead of to the screen. For information about redirection symbols, see "Redirecting Input, Output, and Error Messages," later in this chapter.

Copying a File

You can copy files from one location to another by using the **copy** command. In addition, **copy** can combine files and create files. Just specify a source file that will be copied and a destination file that will receive the copy. You can copy ASCII as well as binary files (the default is binary), but you cannot append ASCII files by using the **copy** command.

Copying One File to Another

To copy the contents of one file to another file, type **copy** followed by the names of the source file and the destination file.

For example, to copy the contents of the file OLD.TXT to the file NEW.TXT, type the following:

copy old.txt new.txt

If NEW.TXT doesn't currently exist, it is automatically created, then OLD.TXT is copied to it. If NEW.TXT does exist, it is replaced by the contents of OLD.TXT. Be careful when you copy the contents of a file to an existing file, since the contents of the existing file will become permanently lost.

If you do not specify a directory path, MS OS/2 copies files in the current directory. If you want to specify files in other directories, make sure that you include their directory paths. For example, to copy the contents of OLD.TXT in the current directory to NEW.TXT in drive A, type the following:

copy old.txt a:new.txt

To copy the contents of a file on drive A called INVOICE.DOC to your current directory and name the new file INVOICE.DOC, type the following:

copy a:invoice.doc

If you don't specify a destination, the file is copied to the current directory.

Copying a Group of Files

You can use wildcard characters to copy a group of files to another group of files. For example, to copy the contents of all of the files in the current directory that have the filename extension .EXE to an identical set of files in drive A, type the following:

copy *.exe a:

You can also copy a group of files to a specific directory. For example, to copy the contents of all of the .TXT files to the LETTERS subdirectory in the FINANCE directory, type the following:

copy *.txt \finance\letters

There may be times when you'll want to copy an entire directory into another directory. For example, to copy all of the files in the current directory into the REPORTS directory in drive A, type the following:

copy *.* a:\reports

Be sure the directory exists; if it doesn't, MS OS/2 will create a file called REPORTS in the root directory on drive A, then copy the contents of all of the files into that one file.

Note If you want to copy the contents of an entire floppy disk onto another floppy disk, use the **diskcopy** utility, which is described in Chapter 8, "Using MS OS/2 Utilities."

Appending a File to Another File

In addition to copying files, the **copy** command can append one or more files to an existing file or combine them into a new file. (The original files will still exist, unless you have made one of them the destination file.) To do this, simply list any number of files as arguments to the **copy** command. The files to be combined should be separated by plus signs (+), and you can specify a destination file that the combined files will be copied to.

For example, suppose that you want to combine two files named JAN.FIL and FEB.FIL. To add the contents of FEB.FIL to JAN.FIL, type the following:

copy jan.fil+feb.fil

When the operation is completed, **cmd** displays the following message: "1 file(s) copied." The plus sign (+) between the files means that the contents of the FEB.FIL file will be added to the JAN.FIL file. (FEB.FIL will still exist in its original form.)

You can combine several files and copy them to another file. So, if you want to add the contents of the files JAN.FIL, FEB.FIL, and MAR.FIL to a new file called WINTER.FIL, type the following:

copy jan.fil+feb.fil+mar.fil winter.fil

If you specify a destination file when you append files, the destination file is created and given the current date and time. If you omit a destination file, MS OS/2 combines the files and stores them under the name of the first specified file.

You can also combine several files into one file by using wildcard characters. The following command takes all files with the .TXT extension and combines them into one file named COMBIN.FIL:

copy *.txt combin.fil

In the following example, each file that has the extension .TXT is combined with its corresponding .REF file. The result in each case is a file with the same filename, but with the extension .FIL. For example, VIDEO.TXT would be combined with VIDEO.REF to form VIDEO.FIL; AUDIO.TXT would be combined with AUDIO.REF to form AUDIO.FIL; and so on.

copy *.txt+*.ref *.fil

If .TXT files do not correspond exactly with .REF files, existing files are copied singly to the .FIL files.

The following **copy** command combines all of the files with the extension .TXT and all of the files with the extension .REF into one file named COMBIN.FIL:

copy *.txt+*.ref combin.fil

Creating a File

In the previous examples, you have seen how to copy files to other files. But the **copy** command can also copy to a file what you type on the keyboard. You simply specify **con** (for console) after the **copy** command. To MS OS/2, the keyboard is known as CON.

For example, to create the file MESSAGE.TXT, type the following:

copy con message.txt

Then press ENTER and type the text of the message. For example, you could type the following:

I have just received your shipment of invoices.
Thanks for your prompt response.

T. K. Smith

To end the note and save it in the file, press CTRL+Z followed by ENTER. You'll see a message saying "1 file(s) copied," then the command prompt again.

If you use the **dir** command to view the directory entries, you'll see that the file MESSAGE.TXT now appears in your directory.

Note The **copy** command has three additional options. The **/v** option verifies a copy operation, the **/a** option copies ASCII files, and the **/b** option copies binary files. For more information on how to use these options, see the *Microsoft Operating System/2 Desktop Reference*.

Deleting a File

Just as you may want to make copies of files, you may also want to remove old or unnecessary files. When you want to delete a file from a disk permanently, you can use the **del** or **erase** command.

Deleting One File

You can delete one file from a directory by typing **del** or **erase** followed by the name of the file.

For example, to delete the file OLD.TXT from the root directory in drive A, type the following:

del a:\old.txt

Use the **dir** command to verify that the file has been deleted. It's a good idea to go through your directories and delete unnecessary files periodically. Unnecessary files take up valuable disk space.

Deleting a Group of Files

You can use wildcard characters to delete a group of files. For example, suppose you are closing out your accounts with a particular vendor named New Moon Supplies. Your current directory contains a variety of files that record business transactions with this vendor:

```
budget.jan
budget.feb
newmoon.inv
newmoon.acc
newmoon.1
newmoon.2
newmoon.fil
report.fil
```

To delete all files starting with the filename NEWMOON, type the following:

del newmoon.*

Now your directory looks like this:

```
budget.jan
budget.feb
report.fil
```

Or, to delete all of the files in your current directory, type the following:

del *.*

When you try to delete all of the files in a directory, the following message appears: "Are you sure (Y/N)?" If you type **y** and then press ENTER, the files will be deleted. If you type **n**, the files will not be deleted, and you will be returned to the prompt.

Use wildcard characters with care—remember that deletions are permanent.

Renaming a File

Occasionally, you may want to change the name of a file. You can use the **rename** command to do this. The short form of this command is **ren**.

For example, to change the name of the file ADS.FIL on drive C to SPONSORS.FIL, type the following at the prompt:

ren c:\ads.fil sponsors.fil

You can also rename a group of files. To rename all the files in the current directory that have the extension .TXT so that they have the extension .FIL, type the following:

ren *.txt *.fil

When you are renaming files, keep these points in mind:

- You cannot rename a file and move it to a different drive or directory in the same step.
- You cannot rename a file using a filename that already exists.

Changing to Another Drive

To change to another drive, type the drive letter followed by a colon (:). For example, if the current drive is drive C, and you want to switch to drive D, type the following:

d:

This switches to the current directory on drive D.

Displaying the Volume Label

Each disk has a volume label, which is a name you assign to the disk during formatting. You might want to give a floppy disk a unique label to help you identify the disk later. If you have set up logical drives, a volume label can describe the contents of the drive (for example, drive D might be called SMITH, and drive E be called JONES).

To view the label for your current disk, type the following:

vol

You can also view the label for a different disk, such as the one on drive A, by typing the drive letter after the **vol** command:

vol a:

You can set the volume label by using the **label** utility, which is described in Chapter 8, "Using MS OS/2 Utilities."

Running Programs

You can run programs such as applications and utilities from **cmd**. This section describes how to start a program, as well as how to set up the proper environment to run a program and how to modify standard input (input from the keyboard), standard output (output to the screen), and standard error (error messages). This section also describes what happens when you start different types of programs from **cmd**.

Starting a Program from Cmd

To start a program from **cmd**, do the following:

▶ At the prompt, type the command that starts the program, followed by any arguments, and press ENTER.

For example, suppose that you want to prepare the payroll checks for your employees by using a spreadsheet program named SP. To start the program, type the program's start command, in this case **sp**. Then press ENTER.

Note See your program's manual for the specific command that starts the program.

After your program starts, the output you see on the screen depends upon the type of program you are running. Some full-screen programs, for instance, can run in a window as well as in a full screen. If you start them from **cmd** in a window, they run in a window; if you start them from **cmd** in a full-screen session, they run in a full screen. Presentation Manager applications, on the other hand, run in a window even if you start them from **cmd** in a full screen. The following list shows the various types of MS OS/2 programs you can run from **cmd**, and what their output looks like depending on where you start them:

Program type	Started from cmd In a window	Started from cmd In a full screen
Full-screen only	Full-screen output	Full-screen output
Full-screen or window	Window output	Full-screen output
Presentation Manager	Window output	Window output
DOS	Error message	Error message

In MS OS/2, DOS programs can be run only in the DOS session.

Starting a Presentation Manager Application

You can start a Presentation Manager application from **cmd** when it is running in a full screen or in a window. After you type the name of the command and press ENTER, your application starts to run in a new Presentation Manager window.

While you're running the application, you won't be able to see the **cmd** prompt at all, even though **cmd** continues to run your application behind the scenes. When you quit your application, the application's window disappears and the **cmd** prompt reappears.

Starting a Full-Screen Program that Can Run in a Window

Some full-screen OS/2 programs can run either in a full screen or in a window. You can start these programs from **cmd** in a full-screen session or from **cmd** in a window.

When the program is started from a full-screen session, it takes up the entire screen until you quit the program. When the program is started from **cmd** in a window, it runs in that same window (not in a new window). After you quit your program, the **cmd** prompt reappears.

Starting a Full-Screen Program that Must Run in a Full Screen

Some full-screen OS/2 programs are designed to be started from **cmd** when it is running in a full screen. If you start the program from **cmd** running in a window, the program's output appears on the full screen, then switches back to the window after the program is through running. Many programs display output on the full screen for only a few moments before switching back to the window.

If this happens, start **cmd** running in a full screen, then start your program.

Setting the PATH and Other Environment Variables

Starting programs from **cmd** is identical to using commands, except that you must be in the directory where the program is located or you must have set the PATH environment variable to include that directory. The PATH environment variable specifies which directories MS OS/2 will search for programs you start. If you add your program's directory to the search path, MS OS/2 can find and start your program regardless of which directory you are currently working in.

You might also need to set other environment variables, such as DPATH, LIB, or TMP, depending on whether your program requires them. For information on setting environment variables, see "Setting Up the Environment," later in this chapter.

Starting a Program with the Start Command

The **start** command lets you start a program in a new full-screen OS/2 session or in a new window (but not in the DOS session). **Start** provides an alternative to Start Programs, and also lets you start programs from a batch file. Various options to **start** provide you with different ways to start programs.

To start a new program, type **start** followed by the name of the program. If you type **start** by itself, **cmd** starts running in a new window.

After typing the name of the program, you can specify a program title and options. The **start** command's options are described in the following sections. If you don't supply options, **start** tries to determine the type of program you want to start (full-screen or Presentation Manager), and starts the program in the appropriate session.

If you start a program with the **start** command from a full screen or in a window running **cmd**, a new window is created for your program (if the program can run in a window). If the program cannot run in a window, a new full-screen session is created to run your program. Once programs start running, you can stop them at any time by pressing CTRL+C.

The new program starts in a background session or window, not in the one you are currently working in. You will need to switch to that session or window before you can view the program or work with it. (See "Starting a Foreground Program," later in this chapter, for an alternate way to make a new program appear in the foreground.)

Specifying a Program Title

To specify a program title for the new program, type the title, enclosed in quotation marks, immediately after the **start** command. This title will be displayed in the title bar of the window where the program is running, as well as in the list of programs in Task Manager.

For example, suppose that you want to start a program called SP and you want to give it the program title "Harris Co. Spreadsheet." To specify the program title when you start the program, type the following:

start " Harris Co. Spreadsheet" sp

You'll see SP start in a window. The title bar and the Task Manager entry for SP will both say "Harris Co. Spreadsheet."

Using Start in Batch Programs

The **start** program is used most often in batch programs for activities such as starting programs during system start-up. If you know that you want a particular program to run every time you start MS OS/2, you may want to use the **start** command in a start-up program. For more information about batch programs, see "Writing Batch Programs," later in this chapter. For information about start-up programs, see Chapter 12, "Using Start-up Files in MS OS/2."

Causing Cmd to End Automatically

You can cause **cmd** to end after a program finishes running, by using the **/c** option. Normally, after a program that was started with the **start** command finishes running, the new session or window that was created does not disappear. When you specify the **/c** option, the new full-screen session or window closes after the program ends.

You can use this option to start a program without keeping an extra copy of **cmd** running. For example, suppose you want to run the **chkdsk** utility when you start or restart MS OS/2 and place the status report for drive A in the file STATUS. You could enter the following line in your STARTUP.CMD file:

start /c chkdsk a: > c:status

If you don't specify otherwise, MS OS/2 will create STATUS on your start-up drive (usually drive C). For more information on STARTUP.CMD, see Chapter 12, "Using Start-up files in MS OS/2."

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If you've put this line your STARTUP.CMD file, then every time
STARTUP.CMD is run, the **start** command starts **cmd** in a new win-
dow, runs **chkdsk**, saves the **chkdsk** status information in the STATUS
file, and then closes the window. You can then view the STATUS file
to see the status information for drive A.

Starting a Program in a Full Screen

To start a program in a full-screen OS/2 session, use the **/fs** option.
Some programs are designed to be run only in a full screen. If you start
these from **cmd** running in a window, these programs display their out-
put in a full screen, then switch back to the window, making the output
unreadable. The **/fs** option guarantees that when you start the program,
it will display its output in a full screen.

Starting a Foreground Program

You can start a program that is displayed in the foreground by specify-
ing the **/f** option. This way, when the program starts you can see it run-
ning in the session or window you are currently working in.

Other Options to the Start Command

The **start** command has several other options, which are listed below.
For details about these options, see the *Microsoft Operating System/2
Desktop Reference*.

Option	Purpose
/k	Preserves the new session or window after the program ends. This is the default.
/n	Causes a program to start without first starting **cmd**.
/win	Specifies that the program will be run in a window.
/pm	Specifies that a Presentation Manager application will be started.
/i	Causes the newly started copy of **cmd** to inherit the environment specified in CONFIG.SYS. The **/i** option is described in "Inheriting the Environment of the Session," later in this chapter.

Starting a Background Program with the Detach Command

To start programs running in the background, use the **detach** command. These programs run, but they don't run in a session. This means that you can't provide input to them (such as typing commands) and they don't display output. In addition, detached programs do not appear in the Task Manager list.

To detach a program, type **detach** followed by the name of the program you want to run in the background. For example, if you want to run the **xcopy** utility as a detached program and have it copy all the files in the BIN directory to the disk in drive A, while you go on to use other commands from the prompt, type the following:

detach xcopy bin a:

Once you start a background program, MS OS/2 starts an independent process for the program, displays the message "The Process Identification Number is *nn*", and displays the **cmd** prompt again. After the prompt appears, you can continue to type commands and run programs while your background program runs.

Programs that can run without user input and that take a long time to run are good candidates for background processing. That way, you don't need to have **cmd** running in a full screen or window just to start one program. It's a good idea to avoid unnecessary full-screen sessions or Presentation Manager windows, because extra sessions and windows slow down the performance of your computer. A keyboard-monitor program is an example of a program that you must run in the background, since this type of program waits for the user to press certain keys before starting.

Since you can't see the output of a background program, you should redirect the output to a file or device. For example, suppose that you want an alphabetical listing of a very large list of names. The following command starts a background process that reads the names from the file NAMES, sorts them, and writes them to the file SORT.DIR:

detach sort < names > sort.dir

While this is taking place, you can continue to run other programs from the **cmd** prompt. For a detailed explanation of the pipe (|) and redirection symbols (>, <, or >>), see "Redirecting Input, Output, and Error Messages," later in this chapter.

Setting Up the Environment

The environment consists of a collection of variables used by the system. These variables, called environment variables, are user-defined and can be assigned values of your choosing. There are certain environment variables that are commonly used by programs, such as PATH and DPATH, although you can also define your own environment variables.

When you start a program from **cmd,** the system searches for the program in the directories specified by the PATH environment variable. Some programs also use the DPATH environment variable, which specifies the data search path to use. If you're a programmer, you might need to set the LIB (library search path) and INCLUDE (include-file search path) environment variables.

This section describes how to set up the PATH and DPATH environment variables, as well as how to use the **set** command. For more information about environment variables, see Chapter 13, "Using MS OS/2 Configuration Commands."

Displaying Your Path

After you install your program—but before you run it—you may need to modify your PATH environment variable. **Cmd** uses this variable to search for programs that you start from **cmd.** When you type a command to start a program, **cmd** first searches your current directory for the program. If it doesn't find it there, **cmd** searches the first directory listed by the PATH environment variable, then the second, and so on, until the program is found.

When MS OS/2 is first installed on your system, a default PATH setting is assigned automatically and stored in your environment along with other environment variables. You can view your path by typing the following:

set

Your path is listed on the "PATH=" line. More than one directory can be specified, separated by semicolons. (You can also view your path alone by typing **path** by itself. This will display just the "PATH=" line.)

You can always run a program if you are already in the directory where it is installed or if you specify the exact path of the program on the command line. It is usually easier, however, to modify your path so that you can run your program while you're in any directory.

Setting Your Path

To modify the PATH environment variable, you can use the **path** command. To use this command, type **path** followed by the directories you want in your search path. Separate directory names with a semi-colon (;).

For example, suppose you want to add the APPS directory to your search path. Your current path is set to the OS2 directory and several of its subdirectories. You can type the following to set the new path:

path c:\os2;c:\os2\dll;c:\os2\system;c:\os2\intro;c:\apps

Restarting MS OS/2 will remove path assignments made with the **path** command.

In addition to the **path** command, you can also use the **set** command to set your search path. This command is described in the following sections. Or you can set your path by using the **set** configuration command. See Chapter 13, "Using MS OS/2 Configuration Commands," for information on how to use this command.

Setting Up a Data Search Path

You can set up a search path for data files by using the **dpath** command. Just as the **path** command tells **cmd** where to locate program files, the **dpath** command tells programs where to locate data files. A data file is any file not having the file extension .EXE, .COM, .CMD (in a full-screen session or in **cmd** running in a window), or .BAT (in the DOS session).

For example, to tell MS OS/2 to search for data files first in your current directory and then in the ACCOUNTS directory, type the following:

dpath accounts

Note Not all programs use the DPATH variable in their data searches. If it is not used, DPATH is ignored.

Setting an Environment Variable

To set environment variables, you can use the **set** command. You set environment variables by typing **set** followed by the name of the variable, an equal sign (=), and the value.

To view your current environment, type **set** by itself. You'll see a list of environment variables and the values that are assigned to them.

The form a value takes depends on what the variable is and what it's used for. For example, while the PATH variable requires directory paths, the PROMPT variable requires the special characters that define the way the prompt looks.

To define or redefine an environment variable, type **set** followed by the name of the variable, an equal sign, and the value. If you want to define an environment variable called TEMP and assign the TEMP directory on drive C to it, type the following:

set temp=c:\temp

Now if you type **set** by itself, the TEMP variable appears in the list.

In most cases, however, you will want to append, not override, any new values to your existing settings. For example, suppose that your current path looks like this:

```
PATH C:\OS2;C:\OS2\DLL;C:\OS2\SYSTEM;C:\OS2\INTRO
```

Also, suppose that you have just installed a spreadsheet program called SP in the directory APPS and you want to be able to run your program from any directory. You could add the APPS directory to the search path by typing in the existing path, then adding the APPS directory to the end of the list. An easier way to do this is to use a variable in the **set** command.

To append a value to your path, type the following:

set path=%path%;c:\apps

The *%path%* variable is replaced by the existing path, and APPS is appended to the end of the list. After you have set your path, verify that it has been added by typing **set** again.

Deleting a Setting

To delete the current setting for an environment variable, type **set** followed by the name of the variable and an equal sign, but do not type a value to be assigned to the variable. For example, to delete the DPATH environment variable and its current setting from your environment, type the following:

set dpath=

Inheriting the Environment of the Session

To start a new copy of **cmd** in a window and have it inherit the environment that was set up when you started your system, use the **start** command with the **/i** option. Normally, when you type **start**, the new copy of **cmd** inherits the environment of the current session. Since you can change the environment at any time by using the **path** and **set** commands, your current environment may not be the same as the one that you originally set up in CONFIG.SYS.

To cause a new copy of **cmd** to inherit the environment set up in CONFIG.SYS, type the following:

start /i

Cmd starts to run in a new window. If you now type **set** by itself, you'll see that the new environment is identical to the environment set in CONFIG.SYS. (For information about environment variables set in CONFIG.SYS, see Chapter 13, "Using MS OS/2 Configuration Commands." For more information about the **start** command, see "Starting a Program with the Start Command," earlier in this chapter.)

Redirecting Input, Output, and Error Messages

When an MS OS/2 program runs, it usually expects input (data) and it usually produces output (results). For example, the output of the **dir** command is a directory listing that is usually displayed on your screen. In addition, if the system encounters errors while running a program, it produces error messages.

MS OS/2 programs can receive input from different devices, such as a keyboard, a disk file, or a modem. Similarly, programs can send their output and error messages to different destinations, such as a computer screen, a disk file, or a printer.

By default, MS OS/2 programs receive input from the keyboard, and send output to the screen.

Other Input

Other Output,
Other Error
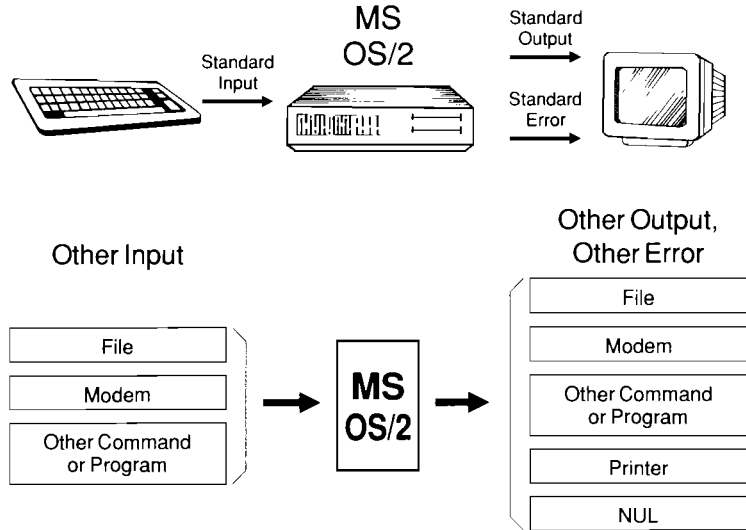
Information that you type at the keyboard is called *standard input*, or STDIN, and the information that is sent to the screen is called *standard output*, or STDOUT. In addition, if the system encounters an error condition, it normally sends error messages to the screen. This is called the *standard error*, or STDERR.

If you want MS OS/2 to have input come from a source other than the keyboard, or have output or error messages sent to a device other than the screen, you can use two powerful features of MS OS/2: *redirection symbols* and *pipes*.

Redirection symbols let you change the way that MS OS/2 deals with input and output. Instead of taking input from the keyboard, for example, you could direct MS OS/2 to get data from a file on your disk. Instead of displaying output on the screen, you could send the program's output or error messages to a printer.

Pipes let you take the output of one program and use it as the input to another program.

Redirection symbols and pipes are described in the following sections.

To keep track of data and identify files, MS OS/2 uses *file handles*, and some of these can be useful in redirection. By default, STDIN is assigned the value (or handle) of 0, STDOUT has the value of 1, and STDERR has the value of 2. Valid handle values range from 0 to 9, although handles 3 through 9 must be assigned by programs for them to be used.

Pipes and redirection symbols can be used alone or in combination, to change where input is read from and where output and error messages are written to. This lets you redirect input, output, and error messages to a file or device other than the keyboard or the screen.

Saving Program Output in a File

Instead of displaying messages on the screen, you can have those messages sent to a file on your disk or to a physical device (such as a printer).

To redirect the standard output (STDOUT) to a file or device, use a greater-than sign (>) in your command. Unless you specify a number before the greater-than sign, the standard output (handle 1) is assumed. This means that > and 1> are equivalent.

For example, to redirect the output of the **dir** command to a file named DIRLIST.TXT, type the following:

dir > dirlist.txt

If you now use the **type** command to view DIRLIST.TXT, you'll see that the directory listing appears in the file. If the filename you specify doesn't already exist, MS OS/2 creates a new file and stores your directory listing in it. However, if the filename does already exist, MS OS/2 replaces what is in the file with the new data (the old contents of the file are lost), so be sure not to specify the name of an existing file that you want to keep.

Sending Program Output to a Device

You can also redirect standard output to a device. For example, if you want to send your directory listing to a printer that is attached to your computer's first parallel port (LPT1), type the following:

dir > lpt1

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Or, to send your listing to a terminal that is attached to your computer's first serial communications port (COM1), type the following:

dir > com1

Remember that your devices must be installed and running properly before you can redirect output to them.

If you don't want output to be displayed on the screen or sent to a device, you can redirect it to NUL. Anything that is sent to NUL is discarded.

To redirect standard output from the **dir** command to NUL, type the following:

dir > nul

Note that error messages (STDERR) will still be displayed on your screen, since you have only redirected output.

Finally, if your program sends output to handles 3 through 9, you can redirect standard output to a file or device by specifying the handle number before the greater-than sign. For example, if you typed **myprog 3> outfile**, this would take any output from MYPROG that is sent to handle 3 and send it to OUTFILE.

Appending Output to a File

If you want to add standard output to a file (instead of replacing the entire file), you can use two greater-than signs (>>) to tell MS OS/2 to append the output of the command (such as a directory listing) to the end of the file you specify. For example, to append your directory listing to an existing file named NEWLIST.TXT, type the following:

dir >> newlist.txt

When you redirect output with two greater-than signs, the existing contents of the file are not overwritten.

Reading Input from a File

If you want your program to read input from a file, use a less-than sign (<) in your command. Unless you enter a number before the less-than sign, standard input (handle 0) is assumed. This means that < and 0< are equivalent.

It is often useful to have input for a command come from a source other than the keyboard, such as a file. For example, suppose you have a file called NAMES.FIL that lists the names of several clients. If this list is not in alphabetical order, you could sort the file's contents by typing the following:

sort < names.fil

The **sort** utility takes the contents of NAMES.FIL as its input and displays the contents alphabetically on the screen.

Reading Input from and Saving Output in a File

You can have a program both read input from a file and save output in another file by combining redirection symbols. For example, to take the sorted client list in NAMES.FIL and save it in a file called CLIENTS.NAM, type the following:

sort < names.fil > clients.nam

Thus, NAMES.FIL is the input to the **sort** utility and CLIENTS.NAM is the output.

Saving Error Messages in a File

By default, MS OS/2 displays error messages (STDERR) on your screen. It is sometimes helpful, however, to store them in a file. That way, you have a permanent record of any errors you encounter while running a program.

Suppose you are planning to copy all the files on drive C that contain the filename extension .TXT to drive A. To do this and to create a file to hold the error messages that may appear while the files are being copied, type the following:

copy *.txt a: 2> logfile.mes

Any error messages that the operating system sends out during the copying operation are now stored in the file LOGFILE.MES. If you use the **type** command to view LOGFILE.MES, you'll see the error messages that would normally be displayed on your screen. In this case, the message might be "SYS0002: The system cannot find the file specified." You must use the number 2 before the redirection symbol to specify that the error messages, not the command's output, are being redirected to LOGFILE.MES.

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Sending Both Output and Error Messages to One File

If you want your log file to contain both standard output and standard error messages, you can redirect them both to the same output device or file. This can be useful when you run a detached program, since you can't view the output from programs that are running in the background. After the detached program finishes running, you can view an output file that contains output and error messages that would normally be displayed on your screen.

For example, suppose you want to use the **dir** command to list all the (handle 1) and the standard-error messages (handle 2) to the file LOGFILE.MES, type the following:

dir *.txt > logfile.mes 2>&1

In this example, "2>&1" tells MS OS/2 that any output written to handle 2 will have the same effect as if it were written to handle 1. Therefore, the LOGFILE.MES file will contain both the output of the **dir** command and any error messages. The order of the symbols and arguments in the command is very important here: "2>&1" must follow the name of the file.

Sending Output and Error Messages to Different Files

If you want output or error messages to be directed to two different files, specify the filenames separately:

dir *.txt > outfile.doc 2> errfile.doc

Now any output from the **dir** command is in OUTFILE.DOC, and error messages are in ERRFILE.DOC.

Taking Output from One Program and Sending It to Another

Another way that you can manipulate input and output is by using pipes. Pipes work by taking the output of one command and using it as the input for the next command. Using pipes save time, since you can run two, three, or more programs from a single command line.

Piped commands are separated by the pipe symbol (|). When you use pipes, the first command on the command line runs as usual. The output of the first command is piped (that is, used as input) to the command that follows the first pipe symbol. The second command then

runs, using the piped input. This process is repeated until all of the piped commands are processed. By using pipes, you could process the same set of data in several different ways.

For example, to view a directory listing of the current directory and then sort the listing, type the following:

dir | sort

The **dir** command is carried out and the output (the directory listing) is piped to the **sort** utility. Then the **sort** utility sorts the output and the screen displays an alphabetically sorted directory listing.

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Tasks that Use Redirection Symbols and Pipes

You can use redirection symbols and pipes to perform many tasks. The following examples show just a few possible uses.

Sorting a Directory Listing and Saving It in a File

You can pipe the output of one command to another command, and then save the output in a file, by combining the pipe and redirection symbols. A useful technique is to pipe two commands together and send the output to a file. For example, the following command creates a file named DIRECT.LST in your working directory:

dir | sort > direct.lst

The DIRECT.LST file now contains a sorted listing of the working directory.

You can also specify a drive other than the default drive. For example, suppose you want to create the file DIRECT.LST on drive B and send the sorted data to it. To do this, type the following:

dir | sort > b:direct.lst

Printing a Sorted Phone List

As you have already seen, you can redirect both the input and the output of a program. It is sometimes useful to print the output of a program. For example, if you wanted to sort a phone list and then print out the sorted list, you could type the following:

sort < phone.lst > lpt1

The contents of the file PHONE.LST becomes the input for the **sort** utility, and then becomes the output to a printer attached to LPT1.

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Reassigning Standard Input and Standard Output

You can assign standard input and output to a different keyboard and terminal. For example, to assign standard input and output to the keyboard and terminal attached to COM1, type the following:

cmd < com1 > com1

This would allow you to run **cmd** on your computer from a remote terminal. This is equivalent to the **ctty** command in MS-DOS.

Preventing Error Messages from Being Displayed

If you don't want error messages to be displayed on your screen, you can redirect them to NUL. Anything sent to NUL is discarded. To send error messages to NUL, type the following:

cmd 2> nul

This command starts a new command interpreter (**cmd**) and sends all error messages to NUL.

Piping Several Commands Together

You can pipe several commands together. For example, to sort several phone lists and display the sorted output one screenful at a time, you could type the following:

type *.lst | sort | more

All of the phone lists having the filename extension .LST are sent as output together to be first sorted, and then displayed one screenful at a time.

Writing Batch Programs

Once you know how to run **cmd** commands, you might want to create
your own programs to carry out complex or specialized tasks. **Cmd** lets
you combine commands and programs into a single program called a
batch program or *batch file*. This saves time over typing each command
separately at the prompt.

Batch programs let you do the following:

- Run several commands from one batch program.
- Carry out the same batch program with different data.

Batch programs are commonly used to simplify a series of repetitive
tasks, thus reducing the amount of typing you need to do. They are also
used to create a custom command that is designed for your particular
work needs. For example, you might need to copy different directories
on a regular basis from your hard disk to a backup floppy disk. Instead
of copying each directory separately by typing five **copy** commands at
the prompt, you could type the name of the batch program once and let
it do the five copying operations for you.

A batch program consists of one or more lines of instructions that **cmd**
reads and processes one at a time. As each line is processed, it is dis-
played (echoed) on your screen. (Later in this chapter you'll learn how
to prevent each line from being echoed.)

In this section, you'll learn how to build a simple batch program to per-
form a series of tasks, then you'll learn how to improve and enhance
this program with advanced batch-programming techniques.

Using Batch Commands

A batch program can contain batch commands, **cmd** commands, MS
OS/2 utilities, or programs that can be run from **cmd** (including other
batch programs). Batch commands give you control over how your
commands are carried out. They also let you send or display messages,
set variables, and use replaceable parameters.

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The MS OS/2 batch commands are as follows:

Command	Purpose
call	Calls one batch program from another batch program.
echo	Turns the echo feature on or off.
endlocal	Restores the drive, directory, and environment settings that were in effect before the setlocal command was used.
extproc	Defines an external batch processor for a batch program.
for	Performs a command for a set of items.
goto	Causes processing to continue at the line after a specified label.
if	Performs a command based on the result of a condition.
pause	Suspends processing of the batch program temporarily.
rem	Adds remarks to a batch program.
setlocal	Defines drive, directory, and environment variables that are used during batch-program processing.
shift	Changes the position of the replaceable parameters in batch-program processing.

Some commands, such as setlocal and endlocal, can be used only in batch programs, while others, such as echo, can be typed at the cmd prompt as well as be placed in batch programs.

Creating Simple Batch Programs

You create a batch program by typing commands in a file using System Editor (or any other text editor) or the copy con command. (For more information on the copy con command, see "Creating a File," earlier in this chapter.) Batch programs that you run from cmd must have the filename extension .CMD. (Batch programs in the DOS session must have the filename extension .BAT. For more information about the DOS session, see Chapter 9, "Using the DOS Session.") It is a good idea to remove blank lines from batch files, since each blank line will cause the cmd prompt to be displayed when the program is run.

You run a batch program by typing the name of the batch file. (You do not need to type the extension.)

The examples in this discussion have been simplified as much as possible to illustrate batch-programming commands and techniques. When you write a working batch program, however, you will probably want to embellish it with commands that provide error checking and commands that display helpful messages for the user.

The simplest batch programs usually run utilities and display messages on the screen. They perform the same function that you would perform if you typed a series of commands at the **cmd** prompt.

For example, the following is a simple batch program called Switchto, stored in the batch file SWITCHTO.CMD:

```
@echo off
rem This is a simple batch program
if "%1"=="" goto end
if %1==work cd c:\os2\work
echo Welcome to the WORK directory!
:end
```

This program lets you quickly switch to the directory \OS2\WORK on drive C, regardless of what directory you are currently working in. To run this program, type the following:

switchto work

The first line, "@echo off", is found in most batch programs. It prevents each batch command from being echoed on your screen as it is being processed by **cmd**.

The second line, "rem This is a simple batch program", is a comment statement used to add messages to batch files. **Cmd** does not process **rem** statements when echoing is turned off, so you are free to add whatever comments you want to your batch programs.

The next two lines use the **if** batch command to check for the first argument typed (%1) after the name of the batch file. If you forget to type the argument (" "), the **goto** statement transfers control to the label ":end" and the program ends. If, however, you type **work** (if %1==work), you are switched to the directory \OS2\WORK, and the next line displays the message "Welcome to the WORK directory!"

Later sections describe how to use commands, utilities, and batch commands to create your own batch file.

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Setting Up Your Environment with a Batch Program

One common way to use batch programs is to set up your environment. For example, you can set environment variables such as PATH and PROMPT in an initialization file.

Suppose you want to create a system initialization file called OS2INIT.CMD. You want to set the environment variable TMP in this file, as well as switch to your HOME directory and start the SP spreadsheet program in the foreground. OS2INIT.CMD would look like this:

```
@echo off
set TMP=c:\tmp
cd \home
start /f sp
```

You could type these commands at the **cmd** prompt each time you start MS OS/2, but putting them in a batch file simplifies this process.

Displaying a Message with a Batch Program

The following example creates a very simple batch program that displays the message, "Use echo to display a message." Use a text editor or the **copy con** command to create a file named SPECIAL.CMD, and type the following:

```
@echo off
rem This program displays a message
echo Use echo to display a message.
```

You can use the **rem** batch command to add comments to your program. Any text after **rem** that is on the same line is treated as a comment. If the echo feature is on, **rem** commands are displayed as your program runs; if echoing is turned off (as in this example), no text is displayed.

As mentioned previously, the **@echo off** command turns off the echo feature, which by default is on. This prevents the commands from being displayed on the screen as they are processed. The at sign (@) prevents the text string "echo off" from being displayed as it turns the feature off. The **@echo off** command is often used at the beginning of batch programs to prevent unnecessary output from cluttering up the screen.

Note You can also turn echoing off by typing the **/q** option as an argument to the command that starts your batch program. For this reason, do not use **/q** as an argument to any command in your batch file.

When echoing is off, you can use the **echo** command to display the text that follows it on the same line. You might want to display messages in your batch program to inform yourself or other users of events taking place or to inform them of error conditions that have occurred.

Running a Batch Program

To run your program, type the name of your file, without the extension, then press ENTER. For example, if your batch file is named SPECIAL.CMD, type **special** to run the batch program. If you want to stop your program before it completes, press CTRL+C.

Creating a Custom Command

After using **cmd** for a while, you might find that there are **cmd** commands and utilities that you use on a daily basis. You can create custom versions of these commands that incorporate the options that you always use.

As an example, suppose that you work in a complex multilevel directory structure that contains many subdirectories. Also suppose that you must return to your root directory several times a day. To help you do this, you can create a customized version of the **cd** command. Your version will display the message, "Returning to the root directory", switch you to the root directory on drive C, and display the directory listing for the root directory a screenful at a time. To set up this special version of the **cd** command, type the following lines in a file called HOME.CMD in your root directory:

```
@echo off
echo Returning to the root directory
c:
cd \
dir /p
```

Now, no matter what drive or directory you are currently in, you only need to type **home** and MS OS/2 will return you to the root directory on drive C.

Performing a Series of Tasks with a Batch File

A common use of batch files is to perform copying operations to update files or to create backup disks. Suppose that you have specific files in particular directories on a floppy disk that are updated on a weekly basis and then need to be copied to particular directories on your hard disk. Suppose further that the specific files you are interested in are all the files that contain the extensions .EXE and .LIB and all of

the files in your INCLUDE directory, plus the file README.DOC
from the root directory. This copying operation involves the following
steps:

1. Copy all of the .EXE files that are in the NEW directory on your
   floppy disk to the BIN directory on your hard disk.
2. Copy all of the .LIB files that are in the NEW directory on your
   floppy disk to the LIB subdirectory of the BIN directory on your
   hard disk.
3. Copy all of the files in the INCLUDE directory on your floppy disk
   to the INC directory on your hard disk.
4. Copy the README.DOC file from the root directory on your
   floppy disk to the root directory on your hard disk.

You can create a batch program that performs each of these steps by
typing the following in a file named TRANSFER.CMD:

```
@echo off
rem This batch program copies files from drive A to drive C
echo Copying files ...
copy a:\new\*.exe c:\bin
copy a:\new\*.lib c:\bin\lib
copy a:\include\*.* c:\inc
copy a:\readme.doc c:\readme.doc
```

The **copy** commands in the batch file perform the same operations as
they would if they were typed on the command line. In this example,
the exact directories and files to copy have been specified in the batch
file. In later sections, you'll see how you can let a user type in argu-
ments to a batch program.

To run this program, type **transfer** and press ENTER. The .CMD exten-
sion is optional. You'll see the **copy** command display the files being
copied as the copying operation progresses.

```
Copying files ...
A:\NEW\MOVE.EXE
A:\NEW\TEST.EXE
        2 file(s) copied.
A:\LIB\SLIBCE.LIB
A:\LIB\MLIBCE.LIB
A:\LIB\LLIBCE.LIB
        3 file(s) copied.
A:\INCLUDE\OS2.H
A:\INCLUDE\TYPES.H
A:\INCLUDE\STDIO.H
A:\INCLUDE\OS2DEF.H
        4 file(s) copied.
A:\README.DOC
        1 file(s) copied.
```

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Using Replaceable Parameters

The preceding Transfer program illustrates how one program can per-
form several copying operations. These operations are fixed, since
there is no way to specify which files are copied. But you can also write
a batch program that allows you to specify which files to copy.

Batch programs can contain a special symbol called a *replaceable
parameter*. This symbol is a percent sign (%) followed by a digit from
0 through 9. For example, suppose you type the **transfer** command
followed by three arguments, as follows:

transfer \bin \lib \inc

If you use the %0, %1, %2, and %3 parameters in your batch file, %0
will be replaced by "transfer", %1 by "\bin", %2 by "\lib", and %3 by
"\inc".

The Transfer program created earlier can be changed so that you can
specify on the command line whether you want the BIN, INC, or LIB
directories to be copied from your hard disk to a floppy disk in drive
A. To accomplish this, you will need three features: the **if** batch com-
mand, the **goto** batch command, and the **pause** batch command.

Using the If Batch Command

The **if** batch command causes a command to be carried out if a certain
condition is true. The **if** command can have one of the following forms:

Form	Description
if *string1*==*string2 command*	Compares the character string *string1* with *string2*. If they are the same, *command* is processed.
if exist *filename command*	Checks whether the named file exists. If the file does exist, *command* is processed.
if errorlevel *number command*	Checks the exit code of the command or program that was run just before the **if** statement. If the command or program returns an exit code that is equal to or greater than the number specified, *command* is processed.

(For information about exit codes, see "Checking the Error Level,"
later in this chapter.)

To test whether the condition is not true, use the **if not** batch command. For example, **if not exist** *filename command* executes *command* if the filename does not exist.

Using the Goto Batch Command

The **goto** batch command tells your program to switch to a different part of the file and continue processing the commands at that point. The **goto** command has the following form:

goto *label*

The way you tell the program what part of the file to switch to is by using a *label*. The label is a word or other string of characters that you put in the file, on a line by itself, at the point where you want your program to continue processing commands. For example, **goto end** will cause processing to continue at the command found after the label ":end". You identify a label in the batch file by typing a colon (:) in front of it.

Using the Pause Batch Command

The **pause** batch command temporarily stops your program from running and displays the message, "Press any key when ready . . . ."

You can continue running the program by pressing a key, or you can quit the program by pressing CTRL+C.

Modifying the Transfer Batch Program

The following example modifies the Transfer program so that the first argument typed on the command line is used in a batch file:

```
@echo off
rem This batch program lets you decide which directory to copy
echo Copying files from %1
pause
:chkargs
if "%1"=="" goto end
if %1==\bin goto copybin
if %1==\inc goto copyinc
if %1==\lib goto copylib
echo %1: Unknown option
goto end
:copybin
copy a:*.exe c:\bin
goto end
:copyinc
copy a:*.inc c:\inc
goto end
:copylib
copy a:lib c:\lib
:end
```

The %1 parameter is used in the **echo** command to display whatever argument the user types. The **pause** command lets users determine whether they want to continue copying, or quit the program by pressing CTRL+C.

The program uses the first **if** command, **if " %1" ==" " goto end**, to check whether the user actually typed an argument. If no argument is found, the command causes the program to jump to the label ":end". When you are specifying no argument in an **if** command, you must use quotation marks; if you are specifying an argument, the quotation marks are optional.

The next three **if** commands cause the first argument that the user types to be substituted for %1 and compared to the strings "\bin", "\inc", and "\lib". If a match occurs, the program jumps to the ":copybin", ":copyinc", or ":copylib" label, respectively. After the program has copied the files, the **goto** command causes the program to jump to the ":end" label. Notice that if the user types in an argument other than "\bin", "\inc", or "\lib" (that is, if none of the **if** conditions were true), the message "Unknown option" is displayed and the program jumps to the ":end" label.

Specifying More than One Argument

To make your program more powerful, you will probably want to let users specify more than one argument after the batch program. For example, the Transfer program that you created previously only processes the first argument typed. It ignores any additional arguments.

To let a user specify two directories, you could modify the Transfer program to include the following lines:

```
if %1==\bin goto copybin
if %1==\lib goto copylib
if %2==\bin goto copybin
if %2==\lib goto copylib
```

Both %1 and %2 would be compared to the strings "\bin" and "\lib", and sent to the appropriate **copy** command. But suppose that you want to give a user the option of typing up to 10 arguments after the **transfer** command, with the arguments specified in any order. You would need many **if** commands to test for every possible combination of arguments.

One way to do this is to use the **shift** batch command. This command lets your program process any number of arguments that are typed in any order. Each time **shift** is carried out, the position of the arguments moves down by one. To see how this works, create a file named DISPLAY.CMD with the following lines:

```
@echo off
rem This displays a list of arguments
:start
if "%1"=="" goto end
echo %%1 is now %1
shift
goto start
:end
```

Then type **display** followed by a list of numbers for each argument. Each number will be displayed on a line of its own. The statement **if " %1" ==" "** checks to see whether all of the arguments have been read. In this example, two percent signs (%%) are used to display the actual percent character ("%1") instead of the %1 argument.

Now you can modify the Transfer program to accept any number of arguments, as follows:

```
@echo off
rem Copying multiple directories
pause
:chkargs
echo Copying files from %1
if "%1"=="" goto end
if %1==\bin goto copybin
if %1==\inc goto copyinc
if %1==\lib goto copylib
echo %1: Unknown option
goto end
:copybin
copy a:*.exe c:\bin
shift
goto chkargs
:copyinc
copy a:*.inc c:\inc
shift
goto chkargs
:copylib
copy a:lib c:\lib
shift
goto chkargs
:end
```

The program compares each argument that the user types to the strings "\bin", "\lib", and "\inc", as it did before. But the **goto** statements now direct the program to return to the ":chkargs" label after each argument is processed. Thus, you can type any number of valid arguments in any order, and the effect is the still same.

Repeating a Task

Sometimes, you may want to perform a task on a set of different elements. For example, you may want to type out the contents of three files, or you may want to copy several directories from a floppy disk to your BIN directory. The **for** statement lets you specify the set of elements that a command will work with. To see its use, type the following line in a file called COUNT.CMD:

for %%x in (One Two Three) do echo %%x

If you now type **count**, the following message appears:

```
One
Two
Three
```

The **for** command causes the batch processor to substitute each element in the parentheses, one at a time, for "x". (You can use any character other than the digits 0 through 9 in place of "x".) Then the program processes whatever command appears after the **do** command.

In the preceding example, each element in the set (One Two Three) is substituted for "%x", then "%x" is echoed to the screen. So the first time through the process, "One" is displayed; the second time, "Two" is displayed; and the third time, "Three" is displayed. Thus, the command takes the place of typing the echo command three times. In this example, you must use two percent signs (%%) in a batch file to specify the "x" variable. However, if you type the **for** command at the prompt, only one percent sign is needed.

The following batch file, called BINCOPY.CMD, allows you to copy the contents of up to three directories that are in the current directory to your BIN directory on drive C:

```
@echo off
rem Updating %1 %2 %3
for %%x in (%1 %2 %3) do if not exist %%x goto end
for %%x in (%1 %2 %3) do copy %%x c:\bin
:end
```

The first **for** command checks to see whether all of the directories exist. It does this by first substituting the arguments that the user types for %1, %2, and %3, and then using the **if not exist** command after the **do** command to check to see that all of the directories do exist. If a directory does not exist, the program ends. The second **for** command does the actual copying by substituting each argument, one at a time, for the "%x" in the **copy** command.

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Calling Another Batch Program

You can run, or call, one batch program from another batch program by using the **call** command. When the batch processor encounters this command, it passes control to the called program. When the program is completed, control returns to the original program.

Note If you just start a second batch program from a batch program, the second program will run. However, control will not return to the original batch program after the second program finishes running. You must use the **call** command if you want control to be passed back to the original program.

For example, a main batch program could call other batch programs to perform the actual operations. The following short batch program calls the batch file COPY1.CMD if **/c** is typed as an argument, or calls the batch file DEL1.CMD if **/d** is typed as an argument:

```
@echo off
rem This batch file calls other batch files
if %1==/c call copy1
if %1==/d call del1
```

The batch files COPY1.CMD and DEL1.CMD perform the actual copying or deleting, then they return control to the original batch file.

You cannot use pipes or redirection symbols with the **call** command. A batch file can call itself, but it should contain a command that ends it so that you don't remain in an infinite loop.

Setting Variables in Your Batch Program

You have the option of using variables in your batch programs. These variables are saved in your environment just like the PATH environment variable. To set a variable in your batch program, use the **set** command. For example, to set the variable STDERR to NUL, include the following line in your batch program:

set stderr=2^>nul

Notice that in a batch file you must use the escape character (^) before the redirection symbol (>). The escape character (which is described later in this chapter) tells the batch processor to treat the greater-than symbol as a character, rather than processing it as a redirection symbol; thus, the string "2>nul" is simply assigned to STDERR without being processed.

If you type **set** after running the program, you will see that STDERR has been saved in your environment. To prevent it from being saved, you can type the following to delete the setting:

set stderr=

There are several ways to use variables in batch files. Suppose you need to create a master phone list every week from various phone-list files in different directories. You want to be able to just type the names of the files that contain the phone lists and have them collected in a file called PHONE.LST for later viewing. You decide that you need a batch file that will delete the old phone list, then create a new phone list that contains any phone files you specify on the command line. The batch file will then discard any error messages and display the new phone list on the screen.

```
@echo off
rem This batch file creates a new phone list
del phone.lst
:loop
if "%1"=="" goto displayit
set stdout=^>^>phone.lst & set stderr=2^>nul
type %1 %stdout%
shift
goto loop
rem Now display the phone list
:displayit
type phone.lst %stderr%
```

When you run this batch file, STDOUT is replaced by the string ">>phone.lst", which appends output to the file PHONE.LST. So when the **type %1 %stdout%** command is run, %1 is replaced by the first argument typed, and the contents of the file specified are appended to the PHONE.LST file.

When the phone list is displayed, STDERR is replaced by the string "2>nul", which redirects error messages encountered while sending the output of the file to NUL. Notice that the ampersand (&) (which is described later in this chapter) separates the two operations.

As before, STDOUT and STDERR are saved as variables in your environment after the program ends. You could assign STDOUT or STDERR to null values after you run the batch program, or you could set variables that are local to your batch program by using the **setlocal** and **endlocal** batch commands. Just place **setlocal** at the beginning of the program and place **endlocal** at the end of the program. This tells the batch processor that any variables you set are active only while the batch program is running. After you run your program, these variables aren't saved in your environment.

To see how these commands work, look at the batch file
LOCAL.CMD:

```
@echo off
setlocal
rem This program keeps the variables STDERR and MYVAR from
rem being saved in your environment.
if "%1"=="" echo Valid arguments /s /m & goto end
if %1==/s set stderr=errfile
if %1==/m set myvar="Hi there!"
set
:end
endlocal
```

This program assigns the variable STDERR to the file ERRFILE (if
the user types **/s**), and it assigns the variable MYVAR to the string
"Hi there!" (if the user types **/m**). It then carries out the **set** command,
which displays your environment settings. You will see that either
STDERR or MYVAR appears in the listing of environment variables.
However, if you type **set** after running the batch program Local,
STDERR or MYVAR will not appear as environment variables (unless
you have set one of them previously).

Checking the Error Level

Some MS OS/2 commands and utilities return an exit code when they
are completed; that is, they send a number back to the system to tell it
whether the process ran successfully or not. If the command or utility
ran successfully, it returns an exit code of 0; if it did not run success-
fully, it returns an exit code of 1. You can check this value and specify
what command will then run by placing the command **if errorlevel** (or
if not errorlevel) immediately following the line that runs the original
command or utility. **If errorlevel** checks to see whether the exit code is
equal to or greater than the number you specify.

For example, you could run the **format** utility in a batch file, check to
see that the formatting operation was successful (returned an exit code
of 0), and display a message on the screen by running the following
program:

```
@echo off
format a:
if errorlevel 1 echo A formatting error occurred. & goto end
echo Format successful
:end
```

If the utility returns an exit code above 0, an error message is displayed
and processing jumps to the label ":end". Otherwise, the string "For-
mat successful" is displayed.

Using Special Characters in a Batch Program

Earlier in this chapter, you saw how redirection and pipe symbols (<,>, >>, and |) could be used to specify more than one command on a line. Other symbols also have special meaning to MS OS/2.

Symbol	Meaning
^	Removes a special character's meaning.
( )	Group commands together.
&	Separates multiple commands.
&&	Performs one operation, then another.
||	Performs one operation or another.

While these special characters can all be used on the command line, they are most useful in batch programs. In the following sections, each of these special characters is described.

Removing a Special Character's Function

To remove the meaning of special characters, use the escape character (^) before the character. This lets you use special characters as regular characters in a string.

For example, to redirect the line "hello" into a file named GREET, type the following:

echo hello > greet

If you use the escape character before the redirection symbol, the redirection symbol loses it meaning. To have the batch processor treat the redirection symbol as an ordinary character, type the following:

echo hello ^> greet

Now the entire line is echoed to your screen:

```
hello > greet
```

This is useful if you want to display a special character but don't want the symbol to perform any function.

Grouping Commands Together

To group commands together, use parentheses [( )]. For example, to display a directory listing of drive A and display the contents of the file DIR.LST on drive C, then sort them together, type the following:

(dir a: & type c:dir.lst) | sort

Combining More than One Command

To combine several commands, separate each pair of commands with the ampersand (&). For example, to display a directory listing for drive A, the version of MS OS/2, and the volume label of your current drive, type the following:

dir a: & ver & vol

MS OS/2 processes the individual commands in order, from left to right.

Using the Double Ampersand

The double ampersand (&&) processes the command to the left of the symbol. If the command is successful, it processes the command to the right of the symbol. If the first command is unsuccessful (that is, produces an error), the command to the right is not processed.

For example, the following command displays the contents of the file BUDGET.FIL only if the file exists in the current directory:

dir budget.fil && type budget.fil

Using the Double Pipe

The double pipe (||) processes either the command to the left of the symbol or the command to the right. If the command to the left is successful, it does not process the command to the right. If the command to the left is unsuccessful (that is, produces an error), then the command to the right is processed.

For example, the following command either deletes the file called LETTER.TMP or displays a directory listing of all files with the filename extension .TMP:

del letter.tmp || dir *.tmp

If LETTER.TMP exists, it is deleted. If LETTER.TMP does not exist, a directory listing of all of the files with the .TMP extension is displayed.

8 Using MS OS/2 Utilities

Introduction

MS OS/2 provides programs called *utilities* to help you work with directories and text files, maintain disks, print files, change your keyboard layout, and display help information.

Utilities can run either in a full screen or in a window; you can start them from **cmd** in a full screen, from **cmd** in a window, or from Start Programs. The examples in this chapter assume that you are in a full-screen session and have started **cmd**.

In addition, most of these utilities can also run in the DOS session. Chapter 9, "Using the DOS Session," describes which of the utilities in this chapter can be run in the DOS session and which ones must be run in a full-screen or Presentation Manager session.

Starting a Utility

To start a utility from **cmd**, do the following:

▶ At the prompt, type the name of the program you want to start, followed by any command-line arguments, and press ENTER.

You can also start a utility from Start Programs, if the utility appears on the list of programs that can be started. Do the following:

▶ Double-click the name of the utility.

If you run certain utilities often, you might want to add them to Start Programs. That way, you can run the utility directly from Start Programs without having to start **cmd**. See Chapter 2, "Running Applications with MS OS/2," for details on how to add programs to Start Programs. For more information about running programs and commands from **cmd**, see Chapter 7, "Running Cmd."

Some utilities are designed to be run from a full screen. If they are run from a **cmd** window, these utilities will display their output on the full screen, then they will switch back to the window when the utility is finished running. This may happen so quickly that you don't have time to read the full-screen output. To prevent this from happening, switch to a full-screen session and start the utility again.

Getting Help Information

To display help information about warning or error messages that you may see on your screen, use the Help batch program. Each of these messages consists of a number (for example, SYS1041) and a brief description of the error condition. For a more detailed explanation of the error condition, type **help** followed by the message number.

For example, suppose that you want to use the **type** command to display the file MEMO.FIL. You've forgotten that you had previously deleted this file, and you receive the error message, "SYS0002: The system cannot find the file specified." To see a detailed explanation of this error message, type the following:

help sys0002

The message number can be shortened to 0002, or just 2, if you prefer. A more detailed explanation of the possible problem and the action you might take to correct the problem appears on the screen:

```
SYS0002: The system cannot find the file specified.

EXPLANATION: The file named in the command
does not exist in the current directory or search path
specified. Or, the filename was entered incorrectly.
ACTION: Retry the command using the correct filename.
```

Working with Disks

MS OS/2 provides the following utilities to help you work with disks:

Utility	Purpose
format	Formats a disk.
diskcopy	Copies the contents of a floppy disk to another floppy disk.
label	Assigns a volume label to a disk.
diskcomp	Compares the contents of two disks.

These utilities are described in the following sections.

Formatting a Disk

Before you can use a floppy disk, you must prepare it for use by using the **format** utility. You can also format a previously formatted disk. Formatting a disk erases all of its contents, so you will be starting with a clean slate.

Before you format your disk, make sure that you know what type of disk you have and what type of disk drive is in your computer. The following list shows the types of floppy disks that can be formatted with the **format** utility:

Disk Size	Type
5¼-inch	360-kilobyte (low-density)
5¼-inch	1.2-megabyte (high-density)
3½-inch	720-kilobyte (low-density)
3½-inch	1.44-megabyte (high-density)

By default, **format** will format a disk according to the size and type of drive in your computer. If you don't specify options, and if your computer has a low-density drive, **format** assumes that you are formatting a low-density disk; or if your computer has a high-density drive, **format** assumes that you are formatting a high-density disk. (If your computer has more than one type of drive, the density that **format** assumes will depend on which drive you tell **format** to use.) Later in this section you'll learn about options that override this default.

Formatting a 5¼-inch Disk

To format a 5¼-inch disk (low or high density) in a disk drive of the same size, type **format** followed by the letter of the drive that contains the disk. If you want to format a disk in drive A, type the following:

format a:

Usually, disks are given a volume label that identifies the disk. This label can be up to 11 characters in length. After a disk is formatted, **format** automatically prompts you to type the volume label.

If you prefer, you can specify the volume label as an argument to **format** by using the option **/v:***label* after the drive letter. For example, to give the label REPORTS to the disk in drive A, type the following:

format a: /v:reports

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Since you have already specified the volume label, you won't be prompted to type it after the disk is formatted.

Although a high-density (1.2-megabyte) drive is designed to format high-density disks, you can also format a 5¼-inch double-sided low-density (360K) disk by using the option **/4**. For example, to format a low-density disk in drive B, which is a high-density drive, type the following:

format b: /4

Note This option is designed to format low-density disks that will be used in high-density drives. If you format a disk with the **/4** option in a high-density (1.2-megabyte) drive, you might not be able to read that disk in a low-density (360K) drive.

Formatting a 3½-inch Disk

The **format** utility has two options that are used to format 3½-inch disks: **/t:***tracks* and **/n:***sectors*. These options are normally used to format disks that are of a lower density than the drive (for example, to format a 720K disk in a 1.44-megabyte drive).

The **/t:***tracks* option formats a disk to the number of tracks specified. *Tracks* is the number of tracks per disk. For 720K and 1.44-megabyte disks, this value is 80. If you don't specify this option, **format** uses the size of the drive to determine how many tracks the disk should have.

The **/n:***sectors* option formats a disk to the number of sectors specified. *Sectors* is the number of sectors per track. For 720K disks, this value is 9, and for 1.44-megabyte disks, this value is 18. For example, to format a 3½-inch low-density (720K) disk in drive A, which is a high-density drive, you should type the following:

format a: /n:9

You can't do the opposite, however. You cannot format a high-density disk in a low-density drive.

Copying a Disk

To copy the contents of a floppy disk in one drive (the source drive) to a floppy disk in another drive (the destination drive), you can use the **diskcopy** utility. If the destination disk is unformatted, **diskcopy** formats the disk with the same number of sides and sectors per track as the source disk. Use this utility with care, since **diskcopy** destroys the existing contents of the destination disk.

To run **diskcopy**, type **diskcopy** followed by the names of the source and destination drives. The source and destination drives can be the same; if you don't specify any drives, **diskcopy** uses the current drive as both source and destination. The **diskcopy** utility prompts you to insert the source and destination disks at appropriate times and waits for you to press a key before continuing. If errors are found on either disk, a message appears on the screen, describing the drive, track, and side where the error was found. Then the copying operation continues. After copying the first disk, **diskcopy** asks you whether you want to copy another disk.

Diskcopy is most often used to make backup copies of disks. The **diskcopy** utility copies an entire floppy disk faster than the **copy** command does. For example, many applications require you to make backup copies of the installation disk. To do this using **diskcopy**, insert the installation disk in drive A, and a blank, formatted disk in drive B. Then type the following:

diskcopy a: b:

Or, if your computer has only one floppy-disk drive, specify drive A as both the source and the destination drive:

diskcopy a: a:

The **diskcopy** utility prompts you to insert the source or destination disk at appropriate times.

The copying is done track-by-track and produces an identical copy of the original disk. **Diskcopy** does not work on hard disks, and you cannot run this utility on drives that you have used in the **subst** or **join** utilities. Also, **diskcopy** ignores any assignments created by the **assign** utility, and the source and destination disks cannot be virtual or assigned disks. Certain restrictions apply concerning which types of disks can be copied in certain disk drives.

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Assigning or Changing the Volume Label

To assign a volume label to a drive, or to change the existing label, use the **label** utility.

To use this utility, type **label** followed by the drive letter and the label to be assigned to the drive. If you omit the drive letter, the label will be assigned to the current drive. For example, suppose that you want to change the volume label of drive D from APPS to MKTG. Type the following:

label d:

The current label is displayed, and you are then prompted for the new volume label:

```
 The volume label in drive D is APPS.
Enter a volume label of up to 11 characters
or press Enter for no volume label update.
```

Type **mktg** and press ENTER. If you now type **vol d:** to view the label, you'll see that the label has been changed to MKTG.

You can enter the volume label directly on the command line as follows:

label d:mktg

No messages are displayed. The prompt appears again after the operation is complete.

Comparing Disks

To compare the contents of a floppy disk in the source drive to the contents of a floppy disk in the destination drive, use the **diskcomp** utility. **Diskcomp** does not work on hard disks. The comparison is done track-by-track, and **diskcomp** automatically determines the number of sides and sectors per track based on the format of the source disk. The source and destination disks must be of the same type.

For example, suppose that you receive an update package for a word-processing program. When you are in the middle of making a backup copy of the updated version, you are interrupted, and the floppy disk you have just copied gets mixed in with disks that contain old versions of the program. To determine which is the disk you just copied, place the update disk in drive A and one of the unknown disks in drive B, and type the following:

diskcomp a: b:

Or, if your computer has only one floppy-disk drive, specify drive A as both the source and destination drive:

diskcomp a: a:

Diskcomp prompts you to insert the source and destination disks at appropriate times during the disk comparison.

After you run **diskcomp,** an on-screen message tells you whether the contents of the two disks are identical or not, or if they are not the same type of disk. **Diskcomp** then asks you whether you want to compare two more disks.

Working with Files and Directories

MS OS/2 provides the following utilities to help you manage your files and directories:

Utility	Purpose
xcopy	Copies a directory and its contents to another directory.
tree	Displays a listing of all the directories and files on a drive.
attrib	Displays or sets the attributes of files.

The following sections describe these utilities.

Copying Directories and Subdirectories

To copy an entire directory or subdirectory and its contents, use the **xcopy** utility. To use this utility, specify a source directory that files will be copied from and a destination where files will be placed. The source and destination can be a drive, directory path, and/or filename. If you don't specify a drive or directory path, **xcopy** uses the current drive and directory.

The **xcopy** utility has several useful options. These options are described in the following sections.

Specifying a Directory or Subdirectory

You may want to copy not only the files in a directory, but all of the subdirectories as well. You could copy the files in each subdirectory individually to the destination directory, but this is often very time

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consuming. An easier way is to use the **/s** and **/e** options with **xcopy**. The **/s** option copies subdirectories unless they are empty, while **/e** copies subdirectories that are empty. Together these options enable you to copy the files in the specified directory in addition to the files in all of the subdirectories. You must specify both options in order to copy all subdirectories.

To see how these options work, suppose you have a directory named OS11, which has the following subdirectories and files:

```
                  OS11
_____ | _____
    |               |               |               |
   BIN            BATCH         FILE.DOC         FILE.BAK
    |         _____ | _____
    |              |             |
  MY.EXE       SHOW.CMD      TELL.CMD
```
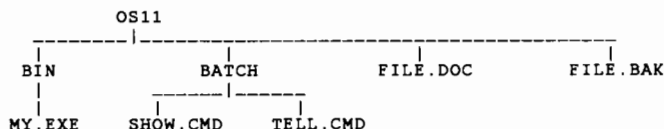
If you type the following, you will copy the files in the OS11 directory, as well as the files in the BIN and BATCH subdirectories, to the root directory in drive A:

xcopy \os11*.* /s /e a:

The **xcopy** utility preserves the original directory structure as it copies files and directories: the OS11 directory will appear in the root directory of drive A, BIN and BATCH will appear as subdirectories of OS11, and so on.

Confirming Each Copying Operation

The **/p** option causes the **xcopy** utility to prompt you with "(Y/N) ?" after displaying the name of each source file and before copying it. To copy the file, type **y** for yes. To prevent that file from being copied, type **n** for no.

Verifying Each Copying Operation

You can use the **/v** option to verify that each file is copied accurately. This compares the destination file to the source file to make sure that they are identical.

Displaying the Directory Tree

The **tree** utility displays the entire directory structure for a drive.

To see the names of all the directories and subdirectories on your current drive (starting with the root directory), type **tree** without arguments. To see the names of all the directories and subdirectories on a different drive, specify the name of the drive after **tree**.

For example, to see the names of all the directories on drive B, type the following:

tree b:

The listing might look something like this:

```
Directory path listing

Path: \ACCOUNTS

Subdirectories: APRIL
                MAY


Path: \ACCOUNTS\APRIL

Subdirectories: None


Path: \ACCOUNTS\MAY

Subdirectories: None
```

Since the directory-tree listing may be very long, you will probably want to do one of two things when you use the **tree** utility. You may want to redirect the output to a file, or you may want to use the **more** utility to view the listing one screen at a time.

Redirecting Output to a File

Use the redirection symbol (>) to send the directory-tree listing to a file. For example, to see the directories on your current drive and redirect them to the file TREE.LST, type the following:

tree > tree.lst

Then you can use the **type** command to view the file TREE.LST, or use the **print** utility to print the file. The **print** utility is discussed in greater detail in "Printing Text Files," later in this chapter.

Viewing the Directory Tree One Screen at a Time

If you have many directories and subdirectories, the directory-tree listing may scroll on your screen too fast for you to read. To view the listing one screen at a time, you can pipe the output of the **tree** utility to the **more** utility as follows:

tree a: | more

Each time a screenful of information is displayed, you'll see the message "-- More --" displayed at the bottom of the screen. Press the SPACEBAR or the ENTER key to display the next screenful.

Displaying Filenames

You can use the **/f** option after the drive letter to display the names of the files within the directories and subdirectories on a drive.

For example, suppose you want to generate a listing of all the files that you currently have on your hard disk. To display the directories, subdirectories, and all of the files on drive C and redirect them to a file named CONTENTS.LST, type the following:

tree c: /f > contents.lst

When the names of all the directories and files on your disk are saved in CONTENTS.LST, use the **print** utility to print the listing.

Displaying and Setting File Attributes

You can use the **attrib** utility to display and set file attributes, which are special features that a file can have. The following attributes can be set:

- Read-only
- Archive

If the read-only attribute is set, you can read a file but you can't change its contents. This attribute is commonly used to prevent a file from being deleted or changed accidentally. If the archive attribute is set, certain utilities that copy files to or from a disk (for example, **backup**, **restore**, and **xcopy**) assume that the file has been created or changed in some way since the last copying operation. This information can then be used to selectively copy only recently modified files.

You have the option of turning these attributes on or off. **Attrib** can also display or set the attributes of files contained in subdirectories.

Displaying File Attributes

To see what attributes are set for one or more files, type **attrib** followed by the names of the files you are interested in. For example, to see which attributes are set on all the files in your current directory, type the following:

attrib *.*

A file listing appears on your screen, containing letters that signify which attributes are set for the file. The attributes are followed by the drive, directory path, and filename. The attribute letters you might see are as follows:

- If the letter "R" appears, the read-only attribute is set for the file. This means that you can read the file, but you can't change it.
- If the letter "A" appears, the archive attribute is set for the file. By default, all files have the archive attribute set when they are created or modified. Certain programs, such as **xcopy**, **backup**, and **restore**, can turn off a file's archive attribute after they run. For more information about how the archive attribute works with these programs, see "Setting the Archive Attribute," later in this chapter.

To gain a better understanding of how file attributes work, suppose that a directory contains the files WORD.LST, ACCOUNTS.OLD, and LETTER.FIL. If you type **attrib *.***, the following appears on your screen:

```
        R   C:\WORD.LST
   A        C:\ACCOUNTS.OLD
   A    R   C:\LETTER.FIL
```

Notice that WORD.LST and LETTER.FIL have their read-only attributes set, so you can read these files but you can't change them. ACCOUNTS.OLD and LETTER.FIL both have their archive attributes set, but WORD.LST has its archive attribute turned off.

To see the attributes for files that are contained in subdirectories as well as the current directory, use the **/s** option. For example, to see the attributes for all files that are contained in subdirectories as well as your current directory, type the following:

attrib *.* /s

When you type the preceding command, the subdirectory file entries are listed first, and the current directory entries are listed last.

Keep the following points in mind when you are copying files:

- When you copy a file by using the **copy** command, the archive attribute is automatically turned on for the file you are copying to (the destination file). This is true even if the file being copied (the source file) has its archive attribute turned off.
- If the source file has its read-only attribute set, this attribute is not copied over to the destination file.

Setting the Read-Only Attribute

The read-only attribute determines whether you can write to a file or a set of files. If the read-only attribute is set, it can prevent a file from being accidentally modified. Use the **+r** option to turn on the read-only attribute, and use the **–r** option to turn the attribute off.

Suppose, for example, that you have saved permanent personnel records in the database file EMPLOY.DBS. To prevent other users from modifying this file, set the read-only attribute by typing the following:

attrib +r employ.dbs

When other users type **dir** to get a directory listing, the read-only attribute can't be seen. However, if they try to use a text editor to modify the file, or if they try to delete the file, they will be prevented from performing the operation.

If you later want to update the personnel records, turn off the read-only attribute by typing the following:

attrib –r employ.dbs

Now this file can be changed or deleted.

Setting the Archive Attribute

The archive attribute can be used as a control mechanism with the **backup**, **restore**, and **xcopy** utilities. Use the **+a** option to turn the archive attribute on, and use the **–a** option to turn it off.

The **/m** option that is used with the **backup** and **restore** utilities copies only files that have their archive attribute turned on. The **/m** option then automatically turns off the archive attribute of the original files after copying them. Thus, if the archive attribute is turned off, the file is not backed up or restored.

With the **xcopy** utility, you can choose to use the archive attribute in doing copying operations. If you use the **/a** option, only those files with their archive attributes set will be copied. If you choose the **/m** option, files with their archive attributes set are copied, and **xcopy** automatically turns off the archive attributes of the original files after copying them.

You won't usually need to turn a file's archive attribute on or off. However, there may be times when you want to modify the way that **backup**, **restore**, or **xcopy** operate on certain files. For example, suppose that each Monday you make a backup disk that contains specific directories by using the **backup** utility with the **/m** option. To save

time, you decide to copy only essential files to the backup disk. Instead of letting **backup** find and copy all of the files that have their attributes set, you can use the **–a** option to turn off the attributes for all of the files that have the extension .BAK. To perform this operation, type the following:

attrib –a *.bak

This means that the files that have the extension .BAK will not be copied when you use **backup** to perform the copying operation.

For more information about the **backup** and **restore** utilities, see Chapter 11, "Maintaining Your System."

Working with Text Files

MS OS/2 provides the following utilities to help you view and work with text files:

Utility	Purpose
more	Displays output from a command or utility, one screen at a time.
sort	Sorts a file alphabetically or numerically.
find	Finds a text string in a file.
comp	Compares two files or sets of files.

The **more** and **sort** utilities (sometimes called *filter* commands) take input from a device or file, process the input, and then send it to an output device or file. As such, they are used in conjunction with redirection symbols or pipes. The **more** and **sort** utilities must be run from **cmd**—they can't be run from Start Programs. For more information on redirection symbols or pipes, see Chapter 7, "Running Cmd."

Displaying Output One Screen at a Time

To display output one screen at a time, use the **more** utility. You can use this utility in two ways:

- To view the output of a command or utility one screen at a time
- To view files one screen at a time

You can either redirect an input file or pipe the output of a command or utility to **more**. After the first screen is filled, the message "– More –" appears at the bottom of the screen. Press ENTER to display the next screen of information.

To view the output of a command or utility one screen at a time, redirect the output to **more**. To do this, use the pipe (|) symbol.

For example, a long directory listing often contains more filenames than can appear in a single screen. You can use the **more** utility to display your directory listing one screenful at a time by typing the following:

dir | more

Other commands and utilities, such as **type**, display output information that can also be piped to the **more** utility. For example, suppose that you have a long file called CLIENTS.NEW that you want to view on your screen. The following command pipes the file to **more**:

type clients.new | more

When you type the preceding command, the CLIENTS.NEW file is displayed one screen at a time.

You could accomplish the same thing by redirecting a file as input to the **more** utility. You could also view the contents of CLIENTS.NEW one screen at a time by typing the following:

more < clients.new

Sorting Input and Output

To sort input or output according to the character found in a specified column, use the **sort** utility. Most often you would want to sort by the character in the first column—that is, by the first character on each line—but you can sort by any column you want. The character is sorted based upon its location in the character set you are using. What character set you are using depends upon the code page that is set up for your system. (See the *Microsoft Operating System/2 Desktop Reference* for the character sets of the different code pages.)

For the United States character set, the characters are sorted from 0 to 9 and then from A to Z. The **sort** utility does not distinguish between uppercase and lowercase letters. You can sort files of up to 64K in length.

You can use the **sort** utility in two ways:

- To sort a file that has been sent as input to **sort**
- To sort the output of another command or utility

Sorting a File

To sort the lines in a file, redirect an input file to **sort**. Each line in the file is sorted based upon the character found in the first column. For example, suppose that the file INFILE.LST contains the following list of customer names:

```
Draper, John P.
Benson, Clara J.
Wiggins, Bess T.
Peters, Marcus
```

To sort the contents of INFILE.LST, type the following:

sort < infile.lst

The list is then sorted and displayed like this:

```
Benson, Clara J.
Draper, John P.
Peters, Marcus
Wiggins, Bess T.
```

If you want to reverse the order so that the file is sorted from Z to A or from 9 to 0, you can use the **/r** option. For example, if you use this option with INFILE.LST, your sorted file will look like this:

```
Wiggins, Bess T.
Peters, Marcus
Draper, John P.
Benson,Clara J.
```

Sorting Output

You can also pipe the output from another command or utility to the **sort** utility. For example, to sort the directory listing for your current directory, type the following:

dir | sort

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You will see your directory listing displayed in alphabetical order.

```
     6 File(s)    841728 bytes free
Directory of C:\CLUB
The volume label in drive C is APPS.
. <DIR>        3-25-89    3:37p
.. <DIR>       3-25-89    3:37p
ACCOUNT   OLD         92  6-25-89    5:52p
CAT       TXT        120  4-16-89    8:26a
LETTER    FIL        252  3-20-89    4:10p
WORD      LST         56  5-10-89   11:16a
```

Sorting by Column

You can specify any column to be used for the sorting. The option /+*n* sorts according to the character in column *n*. For example, to sort your directory listing according to the date it was created or last modified, you could sort according to the date field. Let's say that your date field starts in column 22 of the directory listing. To sort by the date field, type the following:

dir | sort /+22

Your directory listing now looks like this:

```
Directory of C:\CLUB
LETTER    FIL        252  3-20-89    4:10p
. <DIR>        3-25-89    3:37p
.. <DIR>       3-25-89    3:37p
CAT       TXT        120  4-16-89    8:26a
WORD      LST         56  5-10-89   11:16a
ACCOUNT   OLD         92  6-25-89    5:52p
     6 File(s)    841728 bytes free
The volume label in drive C is APPS.
```

Searching for a Text String in a File

To search for a text string in a file, use the **find** utility. If **find** finds the string it is searching for, it displays the name of the file followed by the line that contains the string.

To use the **find** utility, type **find** followed by any options, the string you are searching for (in quotation marks), and the name of the file to search. You cannot use wildcard characters (* or ?) in a filename specification. If you don't specify a filename for the search, standard input is used.

For example, to search for the last name "Smith" in the PHONE.LST file, type the following:

find " Smith" phone.lst

If you are searching for a string that contains quotation marks (for example, "Hi there!") you must use two sets of quotation marks before and after the quoted string, and you must use a redirection symbol to redirect input to the utility, as in the following example:

find " " " Hi there!" " " < test.doc

Although you can't use wildcard characters to specify filenames to be searched, you can pipe another command to the **find** utility. For example, if you want to search the files PHONE.MKT, PHONE.ENG, and PHONE.SUP for the name "Smith", pipe the output of the **type** command to the **find** utility as follows:

type phone.* | find " Smith"

This way, the **find** utility searches through three files instead of one. You can also specify more than one file to search by listing each file separately after the search string.

Displaying Lines that Do Not Contain a String

If you want to search a file and display those lines that do not contain the specified string, use the **/v** option.

For example, suppose that you are searching for client names that are listed in the file CLIENTS.LST. To locate the client names that don't have the string "Past Due" after their names, type the following:

find /v " Past Due" clients.lst

Displaying the Number of Lines that Contain a String

To display the numbers of lines that contain the specified string, use the **/c** option. For example, you could find the number of lines that contain the string "Past Due" by typing the following:

find /c " Past Due" clients.lst

If you specify **/c** with **/v**, the **find** utility displays the number of lines that do not contain the string you typed.

Displaying the Line Number

To display the line numbers of any lines that contain a specified string, use the **/n** option. The line number is the relative line number counting from the beginning of the file.

If you specify **/c** with **/n**, the **find** utility ignores **/n**.

Comparing Two Files

To compare one file or set of files with a second file or set of files, use the **comp** utility. The files can be on different drives or in different directories.

To use the **comp** utility, type **comp** followed by the drive, directory path, and filename of both files. If you don't specify a directory path or filename, **comp** assumes that the files are in the current directory on the current drive.

There are several ways in which you can use the **comp** utility.

To compare the contents of drive A with drive C, type the following:

comp a: c:

To compare the contents of the PROFITS directory on drive A and the PROF directory on drive C, type the following:

comp a:\profits c:\prof

To compare the contents of two files, \ORIGINAL\SAMPLE.C and \TEST\SAMPLE.C, in different directories, type the following:

comp c:\original\sample.c c:\test\sample.c

To compare the files in the root directory on drive C that have the extension .ASM with the files in the root directory on drive B that have the extension .BAK, type the following:

comp c:*.asm b:*.bak

If the files being compared are of different sizes, **comp** displays a message telling you of their size differences, and asks you if you want to continue. If you type **y** for yes, **comp** displays the location and contents of any mismatched bytes. After 10 mismatches occur, the comparison stops and you are asked whether you want to compare two more files. An error message appears if **comp** does not find an end-of-file (CTRL+Z) marker in a file.

Printing Text Files

To print any MS OS/2 text file, you can use the **print** utility.

To use the **print** utility, type **print** followed by a filename. By default, **print** sends the file to the printer that is attached to your computer's LPT1 port. If you want to send the file to a printer that is attached to another port, use the option */d:device*. For example, to print the file REPORT.FIL on the parallel printer that is attached to LPT2, type this:

print /d:lpt2 report.fil

The **print** utility automatically feeds one blank page through the printer after the file is printed. Remember that LPT2 and the printer that is attached to it must be set up correctly before you can print to it.

The **print** utility can be used by itself or in conjunction with the print spooler, Spooler Queue Manager. If you plan to use the MS OS/2 spooler, see Chapter 5, "Printing Files," for instructions on how to set up and use the Spooler Queue Manager.

Selecting the Keyboard Layout

To select an alternate keyboard layout, use the **keyb** utility. The keyboard layout defines where the characters in a specified code page will be found on your keyboard.

If you have selected and prepared a code page for a country other than the United States, your keyboard layout will be set up for that country. To change to a keyboard layout for a different country, you must use the **keyb** utility.

To use **keyb**, type **keyb** followed by a two-letter country code. For example, to select the keyboard layout for Germany, type the following:

keyb gr

Make sure that the keyboard country code you select is supported by the code page that is installed. The following list shows the keyboard layouts that are available and the two-letter codes that identify them:

Code	Keyboard	Subcode
BE	Belgium	120
CF	French-Canadian	058
DK	Denmark	159
FR	France	189, 120
GR	Germany	129
IT	Italy	141, 142
LA	Latin America	171
NL	Netherlands	143
NO	Norway	155
PO	Portugal	163
SF	Swiss-French	150F
SG	Swiss-German	150G
SP	Spain	172
SU	Finland	153
SV	Sweden	153
UK	United Kingdom	166, 168
US	United States	103

The subcode specifies a keyboard layout for countries that have more than one keyboard layout. Subcodes are associated with enhanced keyboards only. Because France, Italy, and the United Kingdom have more than one enhanced keyboard, the subcode allows you to select the keyboard you want.

Turning ANSI Support On or Off

The **ansi** utility turns the ANSI extended screen and keyboard support on or off. If ANSI support is turned on, a program that you are using (or creating) can use the ANSI escape sequences. An ANSI escape sequence is a series of characters (beginning with an escape character or keystroke) that you can use to define MS OS/2 functions. For more information about ANSI escape sequences, see Chapter 14, "Using MS OS/2 Device Drivers," and Appendix A, "ANSI Escape Sequences."

By default, ANSI support is on. To turn ANSI support off, type the following:

ansi off

To turn ANSI support back on, type the following:

ansi on

To turn ANSI support on in the DOS session, install the device driver ANSI.SYS by including the following line in your CONFIG.SYS file:

device=c:\os2\ansi.sys

For more information about ANSI.SYS, see Chapter 14, "Using MS OS/2 Device Drivers."

Note The following ANSI escape sequences, which set video to graphics modes, are not supported:

Esc[=4h
Esc[=5h
Esc[=6h

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9 Using the DOS Session

Introduction

In addition to the full-screen OS/2 session and the Presentation Manager session, MS OS/2 provides another working environment, called the DOS session.

If you are familiar with DOS and DOS applications, you'll find that the DOS session operates much the way the DOS operating system does. As the name implies, the DOS session is like having MS-DOS® installed and running on your system. You can use files, disk drives, printers, and serial devices just as if you were running DOS. You can run DOS applications, such as Microsoft Word or Microsoft Windows. In addition, many of the MS OS/2 commands and utilities described in Chapter 7, "Running Cmd," and Chapter 8, "Using MS OS/2 Utilities," can be run in the DOS session.

When you're running programs in the DOS session, a command interpreter called **command** provides the interface to MS OS/2. **Command** reads information that you type at the command prompt and translates it into something your computer can understand.

This chapter describes the DOS session and **command**. Specifically, it describes how the DOS session starts up and is initialized, as well as how to do the following:

- Switch to the DOS session
- Start DOS programs
- Run commands from **command**
- Run utilities from **command**

You'll also find lists of the MS OS/2 commands and utilities that can and cannot be run in the DOS session.

How the DOS Session Starts

Whenever you start MS OS/2, it reads the CONFIG.SYS file. This file contains statements that set up the DOS, full-screen OS/2, and Presentation Manager sessions. To start the DOS session, MS OS/2 runs the DOS command-interpreter program that is specified by the **shell** configuration command. By default, the command interpreter is **command**. Other configuration commands in CONFIG.SYS customize the DOS environment; these are listed in the following section. After the DOS session starts, you'll see it represented by the DOS icon in the Presentation Manager session.

Configuring the DOS Environment

During installation, a default DOS environment is set up for you. You can modify this environment by editing your CONFIG.SYS file. The following configuration commands affect the DOS environment:

Command	Purpose
shell	Specifies the DOS command interpreter.
rmsize	Sets up the amount of memory reserved for DOS programs.
break	Sets up CTRL+C checking.
fcbs	Specifies the number of open file-control blocks.
device	Sets up devices used in the DOS session.
protectonly	Disables the DOS session.

For more information about using these configuration commands, see Chapter 13, "Using MS OS/2 Configuration Commands." Also see "Using a Mouse in the DOS Session," later in this chapter, for information about setting up a mouse for the DOS session.

Running AUTOEXEC.BAT

The first time you switch to the DOS session, **command** automatically searches for a batch file called AUTOEXEC.BAT in the root directory of the drive from which you started MS OS/2. (Note that batch files in the DOS session must have the filename extension .BAT, not the .CMD extension that batch files run from **cmd** must have.) If it doesn't find AUTOEXEC.BAT, MS OS/2 runs the **date** and **time** commands. If AUTOEXEC.BAT is found, it starts to run.

By placing batch commands in your AUTOEXEC.BAT file, you can run commands and utilities, and you can customize the DOS session. Like other batch files in the DOS session, AUTOEXEC.BAT can contain the following:

- **Command** commands
- MS OS/2 utilities
- Batch commands

Typically, the AUTOEXEC.BAT file sets up environment variables and other features. You can also add commands to AUTOEXEC.BAT in order to perform specialized functions. For example, the following AUTOEXEC.BAT file makes your command prompt the name of the current directory followed by the greater-than sign (=). It then changes to the OS2 directory on drive C and sets your TERM environment variable.

```
@echo off
prompt = $p $g
c:
cd \os2
set TERM=vt52
```

In this example, TERM is set for a VT52-type terminal. The **@echo off** command at the beginning of the file prevents the commands from being displayed on the screen as they run.

Switching to the DOS Session

Whenever you start MS OS/2, the DOS session is automatically started for you. To work in the DOS session, you must switch to it.

The following are two ways to switch to the DOS session from Presentation Manager:

▶ If you are using a mouse, double-click the DOS icon.

Or

▶ If you are using the keyboard, use Task Manager.

For information on using Task Manager and switching between sessions, see Chapter 2, "Running Applications with MS OS/2."

After you switch to the DOS session, the screen clears and the DOS command interpreter, **command**, displays a prompt. From this prompt, you can start programs, commands, or utilities.

Switching from the DOS Session

Once the DOS session is started, you cannot quit it. The **command** program started by the system will continue to run, even if you type **exit**. To run a program in a full-screen or Presentation Manager session, you must switch out of the DOS session.

To switch out of the DOS session, you can do one of the following:

▶ Press ALT+ESC to switch to another session.

Or

▶ Press CTRL+ESC to use Task Manager.

When you switch out of the DOS session, any DOS programs that are running will stop until you switch back to the DOS session. However, full-screen or Presentation Manager programs that are running will continue to run when you're in the DOS session.

Starting a DOS Program

To start a program from **command,** type the name of the program at the prompt and press ENTER.

Remember that not all programs can run in the DOS session. For example, Presentation Manager applications and many full-screen OS/2 programs cannot run in the DOS session. If you run a Presentation Manager application in the DOS session, you will receive the following message:

```
This program requires OS/2 Presentation Manager.
```

Or, if you run an application that is meant to run from **cmd,** you will receive this message:

```
This program cannot be run in DOS mode.
```

In either case, switch to the appropriate session before running your program.

Also, while the DOS session operates much like the DOS operating system, compatibility problems can exist with old DOS applications that are run in the DOS session. Read your application's manual for information about which MS OS/2 environment is required to run the program.

Managing Memory in the DOS Session

Certain DOS applications may recommend that you install a disk cache
or virtual disk to improve performance. If you plan to run these appli-
cations in the DOS session under MS OS/2, keep the following points
in mind:

■ The disk-cache program, SMARTDrive, is not supported in MS
OS/2. To set up disk caching, use the **diskcache** configuration com-
mand in your CONFIG.SYS file.

■ The virtual-disk program, Ramdisk, is not supported in MS OS/2.
To set up a virtual disk, use the **device** configuration command in
your CONFIG.SYS file to load the VDISK.SYS device driver.

For information on setting up the MS OS/2 disk cache, see Chapter
13, "Using MS OS/2 Configuration Commands." For information on
installing the VDISK.SYS device driver, see Chapter 14, "Using MS
OS/2 Device Drivers."

Also, read your application's manual for additional information con-
cerning memory management with MS OS/2.

Setting Hardware Features in the DOS Session

The DOS session runs independently of the full-screen and Presenta-
tion Manager sessions. Features such as hardware settings made with
the **mode** utility will be in effect only while you are running the DOS
session. When you switch to a full-screen session or to Presentation
Manager, the DOS settings will not be in effect.

Using a Mouse in the DOS Session

If you want to use a mouse in the DOS session, make sure that you
have specified the proper mouse driver in your CONFIG.SYS file. In
addition, some applications, such as Microsoft Word, require you to
specify an additional device driver called EGA.SYS. For instructions
on how to specify these device drivers in the CONFIG.SYS file, see
Chapter 14, "Using MS OS/2 Device Drivers."

Running DOS TSR Programs

Terminate-and-stay-resident (TSR) programs that are designed to run
in DOS (for example, the SideKick program) can also run in the DOS
session of MS OS/2. Once started, these programs remain active while
you're in the DOS session, but they become inactive when you switch
to a full-screen session or to Presentation Manager. These programs

can occupy a large amount of memory, and compatibility problems can exist if these programs are run in the DOS session. Be sure to read the program's manual for instructions and restrictions concerning MS OS/2.

Using a DOS Command

Command, like **cmd**, has a set of built-in commands. These commands let you work with files, directories, and devices. Most of these commands are identical to those found in **cmd**.

Command has one additional command, not found in **cmd**:

■ **break**

For a description of the **break** command, see the following section, "Setting CTRL+C Checking."

The following **cmd** commands are not supported by **command**:

■ **detach**
■ **dpath**
■ **endlocal**
■ **extproc**
■ **setlocal**
■ **start**

In addition, you cannot run the **cmd** program (the MS OS/2 command interpreter) from **command**.

When you run them from **command**, the following commands do not accept multiple drives or filenames:

■ **del (erase)**
■ **dir**
■ **mkdir (md)**
■ **rmdir (rd)**
■ **type**
■ **vol**

Note Certain commands may display slightly different on-screen messages when they run in the DOS session.

Setting CTRL+C Checking

The **break** command lets you set CTRL+C checking. Normally, MS OS/2 only checks to see whether you have pressed CTRL+C while it is reading from your keyboard or while it is sending something to your screen or printer. You can use the **break** command to turn CTRL+C checking on or off.

By default, CTRL+C checking is off. If the **break** command is turned on, CTRL+C checking is turned on for other functions such as disk reading and writing.

To find out what the current setting is for **break**, type the following:

break

To turn CTRL+C checking on, type the following:

break on

To turn CTRL+C checking off, type the following:

break off

Some programs may internally set CTRL+C checking. The **break** command does not affect these programs.

You can also set CTRL+C checking by placing a **break** configuration command in your CONFIG.SYS file. For more information about setting CTRL+C checking, see Chapter 13, "Using MS OS/2 Configuration Commands."

Running a Utility in the DOS Session

Most of the MS OS/2 utilities that you can run from **cmd** can also be run from **command**. However, the following utilities can only be run in the DOS session:

- **append**
- **assign**
- **graftabl**
- **join**
- **setcom40**
- **subst**

The following MS OS/2 utilities cannot be run in the DOS session:

- **ansi**
- **createdd**
- **ddinstal**
- **fdisk**
- **keyb**
- **spool**
- **trace**
- **tracefmt**

The utilities that run only in the DOS session are described in the following sections. For a description of the other MS OS/2 utilities, see Chapter 8, "Using MS OS/2 Utilities," and Chapter 11, "Maintaining Your System."

You can run the **print** and **mode** utilities in the DOS session and in a full-screen OS/2 session. However, the way you run the commands differs between sessions. For more information, see the *Microsoft Operating System/2 Desktop Reference*.

Note Certain on-screen messages may differ slightly if a utility is run in the DOS session. This will not affect the utility's usage or function.

Reassigning Paths and Drives

To change how MS OS/2 accesses data and drives, you can use the **append, assign, join,** and **subst** utilities. For example, certain applications may require that you set the data path, much as you set the PATH environment variable. Or you might want to change drive or directory-path assignments to make working with a particular drive or directory path easier.

Setting a Data Search Path

To set a data search path in the DOS session, use the **append** utility. Unless you specify a particular directory path on a command line, MS OS/2 searches only your current directory for data files. With the **append** utility you can specify additional directories to be searched for data files. MS OS/2 will first search the current directory for a data file, then search the directories that you have specified with the **append** utility. This can be useful if you have data files located in different directories or located across a network.

Using the **append** utility to set a data search path and store it in the environment requires two steps. First, type the following:

append /e

The **/e** option can only be used the first time you use the **append** utility. This option stores **append** as an environment variable. If you do not want to store **append** in the environment, omit this step.

Second, type **append** followed by the directory paths that you want to add to the data search path. For example, to use the TEST directory on drive A and the SAMPLE directory on drive C as the data path, type the following:

append a:\test;c:\sample

You use a semicolon (;) to separate individual directories. The **append** command must not contain more than 128 characters.

In the preceding example, the following will appear on your screen:

```
APPEND=A:\TEST;C:\SAMPLE
```

To display the data search path, type **append** by itself. When you want to restore the data path to the default (which searches only the current directory for data files), type the following:

append;

To see how **append** might be used, suppose that you have customer-information files stored in the directories CUST1 and CUST2 on drive C, and in the directory CUST3 on a floppy disk in drive A. You could set up your data search path by typing the following:

append /e
append c:\cust1;c:\cust2;a:\cust3

Now, if you want to display the contents of the file SMITH.ACC, which is in one of these three directories, type the following:

type smith.acc | more

MS OS/2 searches the current directory for the file SMITH.ACC. If it doesn't find the file, MS OS/2 searches the CUST1, CUST2, and CUST3 directories in the order they are listed in. If MS OS/2 finds the file in any of those directories, it displays the contents of the file one screen at time.

Assigning a Drive Letter to Another Drive

To assign a drive letter to another drive, you can use the **assign** utility. Some applications require that you put your data disks in a floppy-disk drive. If you prefer to use a hard disk for your data files, you can use

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the **assign** utility to assign a different drive letter to an existing drive. So instead of reading from and writing to an existing drive such as drive A, you can assign drive A to drive C. This means that when you request drive A, you will actually get drive C.

To use the **assign** utility, type **assign** followed by the letter of the drive you want to reassign and the letter of the drive you want to assign the first drive to; separate the two drive letters with an equal sign (=). For example, to assign drive A to drive C, type the following:

assign a=c

Now, if you then type **dir a:**, you will actually see a directory listing for the current directory on drive C.

To reset all drives to their original assignments, type the following:

assign

Note If you plan to use both the **assign** utility and the **append** utility, you must first set the data path by using the **append** utility. You could do this, for example, by including an **append** statement in your AUTOEXEC.BAT file.

The following commands are equivalent:

assign a=c
subst a: c:

Since the **assign** utility disguises the true device type, you should not use **assign** in the following situations:

■ With commands that require drive information; for example, **backup**, **restore**, **label**, **join**, **subst**, and **print**
■ During normal use of MS OS/2

The **format, diskcopy**, and **diskcomp** utilities ignore drive reassignments.

Joining a Drive to a Directory Path

To give a drive the name of a directory path, use the **join** utility. Once you've done this, you don't need to name physical drives with separate drive letters; instead, you just specify a directory path for each drive.

To use this utility, type **join** followed by a drive letter and the path of the directory that will be associated with that disk drive. The drive letter you specify must already exist. You cannot join a drive if it is being used by another process.

For example, if you want to refer to drive D as the DATA directory on drive C, type the following:

join d: c:\data

If the directory does not exist, MS OS/2 creates it. The directory you specify must be empty, and it must be a subdirectory of the root directory.

Now, if you type **dir c:\data**, you will see the contents of the root directory on drive D. You can also type **join** without arguments to see the currently joined drives and directories.

To disable the connection between drive D and the DATA directory, use the **/d** option, as follows:

join d: /d

The following utilities do not work on drives used in the **join** utility:

- **chkdsk**
- **diskcomp**
- **diskcopy**
- **format**
- **label**
- **recover**

Keep in mind that once you have used the **join** command to join a drive, MS OS/2 will display an error message if you try to use that drive letter. You must restore the drive by using the **/d** option before you can refer to the drive again.

Substituting a Drive Letter for a Path

To substitute a drive letter for a directory path, use the **subst** utility. This utility associates a path with a drive letter. The drive letter is then known as a virtual drive, which can be referred to just like a physical drive. When MS OS/2 sees the name of a virtual drive, it replaces it with the drive and directory path that you have assigned to it.

To see what virtual drives are currently in effect, type **subst** without options. To set up a new virtual drive, type **subst** followed by the virtual-drive letter and the directory path that will be substituted for it.

For example, to substitute the virtual drive Z for the directory path \ACCOUNTS\PAYABLE on drive C, type the following:

subst z: c:\accounts\payable

Now, if you type **dir z:**, you will see the contents of the PAYABLE subdirectory of the ACCOUNTS directory on drive C.

To delete a virtual drive, use the **/d** option, as follows:

subst z: /d

The following commands do not work on drives created by the **subst** utility:

- **chkdsk**
- **diskcomp**
- **diskcopy**
- **format**
- **label**
- **recover**

Displaying Disk Status from the DOS Session

The **chkdsk** utility displays status information about a disk and scans it for errors. You can run **chkdsk** from either **cmd** or **command**. While the command form you use to start the utility is the same for both, you receive additional information about the DOS session if you run **chkdsk** from **command**.

In addition to disk-status information, you receive the following DOS storage information:

```
[DOS mode storage report]
   655328 bytes total storage
   472912 bytes free
```

The "bytes free" line tells you the amount of available memory in the DOS session to run other applications. The "bytes total storage" line tells you how much memory is reserved for the DOS session. By

default, 640 kilobytes are reserved. You can change the amount that is reserved by using the **rmsize** configuration command. For more information about setting the amount of memory for DOS applications, see Chapter 13, "Using MS OS/2 Configuration Commands."

Enabling an Extended Character Set

To load an extended character set in the DOS session, when your computer's graphics adapter is operating in graphics mode, use the **graftabl** utility.

To load an extended character set, type **graftabl** followed by a three-digit number that identifies a code page. You can specify any one of the following code pages:

Code page	Extended character set
437	United States (default) code page
860	Portuguese code page
863	French-Canadian code page
865	Nordic code page

For example, to load the French-Canadian extended character set, type the following:

graftabl 863

To display the current extended character set, along with a list of **graftabl** options, type the following:

graftabl ?

To display the current extended character set, type the following:

graftabl /status

To display the current extended character set and load the default extended character set (code page 437), type the following:

graftabl

For more information about setting up code pages, see Chapter 13, "Using MS OS/2 Configuration Commands."

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Setting COM-Port Availability

To make a serial port available to a DOS program, use the **setcom40** utility.

Some DOS applications use a particular area on the disk to determine the presence of the serial ports COM1 or COM2. The COM01.SYS or COM02.SYS device driver places zeros in these locations to prevent DOS-session programs from using these ports.

You should use the **setcom40** utility if you have used the **device** configuration command to install COM01.SYS or COM02.SYS (or an equivalent device driver). The **setcom40** utility sets the appropriate address for the serial port before starting a program in the DOS session that uses the port.

To use this utility, type **setcom40** followed by the name of the serial port you want to use, and specify whether you want to turn serial-port availability on or off. For example, suppose you have a serial printer attached to COM1 and have installed COM01.SYS. If you want to use a DOS-session program to print a file using that printer, type the following:

setcom40 com1=on

When you no longer need to use the printer, type the following:

setcom40 com1=off

Suppose you also want to add an extra terminal to COM2. To do this, type the following:

setcom40 com2=on

Now, both COM1 and COM2 can be used by DOS programs.

When using serial ports in the DOS session, keep the following points in mind:

- The **setcom40** utility does not affect settings made with the **mode** utility.
- Programs that are running in the DOS session should not try to use serial ports that are being used in full-screen OS/2 or Presentation Manager sessions, or serial ports that are being used by Spooler Queue Manager.
- If a program is using serial ports in the DOS session, it is important to end the program before switching out of the DOS session.

■ Two types of DOS-session programs may have problems using serial ports: those that use intermittent hardware interrupts and those that are time-dependent. In addition, some BASIC programs will interfere with the port even when they are not sending input to it or receiving output from it.

For more information about COM0x.SYS device drivers, see Chapter 14, "Using MS OS/2 Device Drivers."

10 Using System Editor

Introduction

System Editor is the MS OS/2 text editor. You can use it to edit data files, such as CONFIG.SYS, AUTOEXEC.BAT, or any of your own data files.

During installation, MS OS/2 adds System Editor to the Utility Programs group in Start Programs. When you start System Editor, it starts and runs in its own full-screen session, so you can switch between it and any other session.

You cannot use a mouse in System Editor.

Editing Your CONFIG.SYS File

MS OS/2 creates a CONFIG.SYS file during the installation process. In general, it is recommended that you not change the configuration command values that MS OS/2 has assigned. However, if you do decide to change a value, you can use System Editor to do so. Always remember to make a backup copy of your CONFIG.SYS file before making any changes.

Starting and Quitting System Editor

You can start System Editor either from Start Programs or from **cmd**.

Starting System Editor from Start Programs

To start System Editor from Start Programs, follow these steps:

1 Select the Group menu, and choose the Utility Programs group.

2 Use the DIRECTION keys to select OS/2 System Editor and press ENTER. Your screen clears and the System Editor screen appears, showing the Edit A File dialog box:
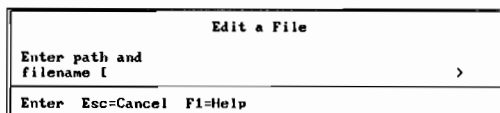
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```
                              Edit a File

    Enter path and
    filename [                                      >

    Enter   Esc=Cancel   F1=Help
```

3 Type the name of the file you want to edit, and press ENTER. If this file does not exist, System Editor creates it.

If you are creating a new file, the System Editor screen looks like this:

```
  Command  Files  Search  Options  Edit                   | F1=Help
L 1 C 1                            example
```
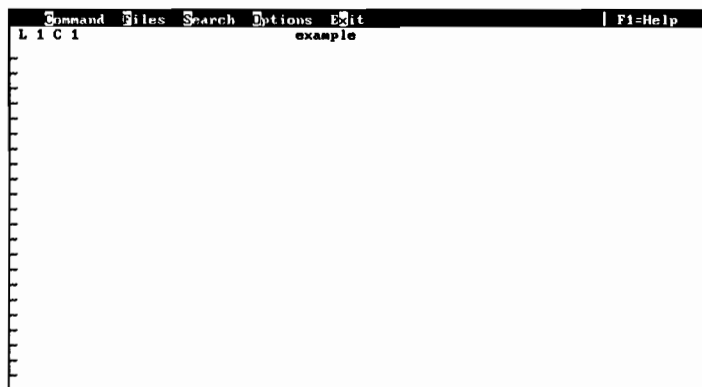
Starting System Editor from Cmd

Do the following to start System Editor from **cmd**:

▶ At the **cmd** prompt, type **e** followed by the name of the file you want to edit, and press ENTER. If this file does not exist, System Editor creates it.

For example, to edit your CONFIG.SYS file using System Editor, type the following at the **cmd** prompt:

e config.sys

This example starts System Editor and opens your CONFIG.SYS file.

You can also specify multiple filenames when you start System Editor from **cmd**. For example, you could type the following:

e config.sys autoexec.bat startup.cmd

This example starts System Editor and opens each of the specified files. You can now switch between these files by using the F2 and ALT+F2 keys. For more information about switching between files, see "Working with Multiple Files," later in this chapter.

Quitting System Editor

To save your file and quit System Editor, use the Save And Exit This File command:

1 Press F10 to select the menu bar.
2 Use the LEFT and RIGHT keys to select the Exit menu.
3 Use the UP and DOWN keys to choose the Save And Exit This File command.
4 Press ENTER.

To quit System Editor without saving your changes, use the Exit This File command:

1 Press F10 to select the menu bar.
2 Use the LEFT and RIGHT keys to select the Exit menu.
3 Use the UP and DOWN keys to choose the Exit This File command.
4 Press ENTER.

If you have made changes to the file, a dialog box appears, telling you that the file has been modified and asking you to confirm that you want to quit System Editor without saving your changes. Type **y** and press ENTER to quit without saving your changes; type **n** and press ENTER to continue using System Editor.

Using Help

System Editor has online Help information. You get Help by pressing F1. You can use Help at any time while you're using System Editor.

The information that Help presents depends on what you have selected in System Editor. For example, if you've selected a menu, pressing F1 gives you Help information for that menu; if you've selected a command on a menu, pressing F1 gives you information for that command. If nothing is selected, you get a dialog box with general information about using Help.

Using the Help Index

Help also provides an online index to System Editor commands, so that you can easily find out how a particular command works. To use the index, follow these steps:

1. From anywhere in System Editor, press F1. A Help dialog box appears.
2. Press F11 (ALT+F1 if your keyboard has only ten function keys). The Help index appears.
3. Use the DIRECTION keys to choose the command you want information about, and press ENTER.
4. Press ESC to return to the index, or press ESC twice to quit Help.

You can also use Help to view the current System Editor key assignments. Use Help as follows:

1. From anywhere in System Editor, press F1. The Help dialog box appears.
2. Press F9. System Editor opens the E.DEF file, and it appears on your screen.
3. You can scroll through the file to look at the various key definitions.
4. Press F3 to close the file.

Saving a File

You can save any changes you've made to a file by using the Save And Continue command from the Files menu, or by pressing ALT+F3. This command saves any changes you've made to the current file.

By using the Autosave command from the Options menu, you can also tell System Editor to save your file automatically after a specified number of lines have been changed. The Autosave command creates a backup copy of the file you are editing, in case your system loses its power. If your system loses its power, the backup file is saved in the current directory and given a name of the following form: up to the first five letters of the filename, followed by a three-digit, sequential number, followed by a numerical three-digit extension. For example, a backup copy of the file MOLLY.TXT might be named MOLLY003.000 by the Autosave command.

To use the Autosave command, follow these steps:

[1] Select the Options menu and choose the Autosave command. The following dialog box appears:

```
┌─────────────────────────────────┐
│      Set Autosave Count         │
│  Lines . . [0     >             │
│  Enter  Esc=Cancel  F1=Help     │
└─────────────────────────────────┘
```

[2] In the Lines text box, type the number of lines to be changed before System Editor automatically saves your file.

[3] Press ENTER.

You must still save the file when you quit System Editor, if you want your changes saved in the original file rather than in a backup file.

Typing and Formatting Text

You can start typing as soon as you've opened a file in System Editor. The cursor moves to the right as you type. If your typing goes beyond the borders of the screen, System Editor automatically scrolls the text to the left so that the cursor is always visible.

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Moving the Cursor

When you start System Editor, the cursor initially appears in the upper-left corner. If you switch to another file and then come back to the first file, the cursor appears where you left it. You can move the cursor to wherever you want to insert or edit text.

To move the cursor, press the following keys:

To move the cursor	Press
Up one line	UP
Down one line	DOWN
To the left one character	LEFT
To the right one character	RIGHT
To the beginning of the current line	HOME
To the end of the current line	END
To the beginning of the file	CTRL+HOME
To the end of the file	CTRL+END

Inserting Text

If you're editing an existing file, you can insert new text into the file. Use the INS key to switch between insert and replace modes. The cursor appears as a flashing rectangle when you're in insert mode. As you insert new text, existing text moves to the right of the cursor.

When you start System Editor, you are in insert mode.

Replacing Text

You can replace existing text by typing over it. Use the INS key to switch between insert and replace modes. The cursor appears as a flashing line when you're in replace mode.

Formatting Text

You can type text exactly as you want it to appear, using the following keys to place the text where you want it:

To do this	Press
Insert a space	SPACEBAR
Delete the character to the left of the cursor	BACKSPACE
Delete the character marked by the cursor	DELETE
End a line of text	ENTER
Indent a line one tab (in insert mode)	TAB
Insert a tab stop (in insert mode)	TAB
Move the cursor back one tab stop	SHIFT+TAB

To split a line of text, move the cursor to the beginning of the text that you want to move, and press ALT+S. System Editor inserts a blank line and places the text on it.

To join two lines of text, move the cursor to the first of the two lines you want joined, and press ALT+J. System Editor joins the line below with the current line.

Scrolling

If the text in the file is longer or wider than can be shown at one time, you can scroll through the file to view the text.

You scroll the text of a file by using a DIRECTION key to move the cursor to the edge of the screen, and then pressing the same DIRECTION key again. For example, to see the next two lines below the bottom of the screen, do the following:

1 Press the DOWN key until the cursor is at the bottom of the screen.

2 Press the DOWN key twice more to display the next two lines of text.

Note   When you scroll up or down, the text scrolls one line at a time. When you scroll left or right, however, the text scrolls half a screen at a time, even though the cursor moves only one column within the file.

You can scroll up or down by the screenful, instead of by the line, by using the PAGE UP and PAGE DOWN keys. You can scroll to the beginning or end of a long line by using the HOME and END keys.

Editing a File

You edit a file with System Editor by using commands from menus, from the command line, or from the keyboard. You can delete text, move or copy text to a new location, and search for text within a file. If you change your mind after editing, you can cancel your last edit. You can even change the name of the file you're working on without quitting System Editor.

Deleting Text

Once you've typed text, you can delete it by using the following methods:

To delete	Press
The character to the left of the cursor	BACKSPACE
The character marked by the cursor	DELETE
The current line	CTRL+BACKSPACE
From the cursor to the beginning of the line	CTRL+B
From the cursor to the end of the line	CTRL+E

You can also delete a block of several lines of text at one time. To do this, follow these steps:

1 Use the DIRECTION keys to move the cursor to the first line of text you want to delete.

2 Press ALT+L to mark the line of text. The line of text is now marked for deleting and is highlighted on the screen. If you change your mind, press ALT+U to remove the mark from the text.

3 Use the DIRECTION keys to move the cursor to the last line of text you want to delete.

4 Press ALT+L to mark the line of text. The line of text and every line between it and the first marked line are now marked for deletion and are highlighted on the screen. If you change your mind, press ALT+U to remove the mark from the text.

5 Press ALT+D to delete the lines of text.

Moving Text

In System Editor, you can move a line or lines of text from one place to another in a text file. Before you can move text, you must mark it. To move text, follow these steps:

1 Use the DIRECTION keys to move the cursor to the first line of text you want to move.

2 Press ALT+L to mark the line of text. The line of text is now marked for moving and is highlighted on the screen. If you change your mind, press ALT+U to remove the mark from the text.

3 If you want to move more than one line of text, use the DIRECTION keys to move the cursor to the last line you want to move, and press ALT+L to mark the line of text. The line of text and every line between it and the first marked line are now marked for moving and are highlighted on the screen.

4 Move the cursor to where you want the text to appear (text will be moved to the line below the cursor).

5 Press ALT+M to move the line(s) of text.

Copying Text

If you want to use the same text more than once in a file, you can copy existing text to another place in the file. Before you can copy text, you must mark it. To copy text, follow these steps:

1 Use the DIRECTION keys to move the cursor to the line of text you want to copy.

2 Press ALT+L to mark the line of text. The line of text is now marked for copying and is highlighted on the screen. If you change your mind, press ALT+U to remove the mark from the text.

③ If you want to copy more than one line of text, use the DIRECTION keys to move the cursor to the last line you want to copy, and press ALT+L to mark the line of text. The line of text and every line between it and the first marked line are now marked for copying and are highlighted on the screen.

④ Move the cursor to where you want the copied text to appear (text will appear on the line below the cursor).

⑤ Press ALT+C to copy the line(s) of text.

Searching for Text

You can search for specific text in a file by using the Locate command from the Search menu. Follow these steps to search for text:

① Select the Search menu and choose the Locate command. The following dialog box appears:

```
┌────────────────────────────────────────────────────┐
│                      Locate                          │
├────────────────────────────────────────────────────┤
│  Locate what? . . [                           >      │
├────────────────────────────────────────────────────┤
│  Enter   Esc=Cancel   F1=Help                        │
└────────────────────────────────────────────────────┘
```
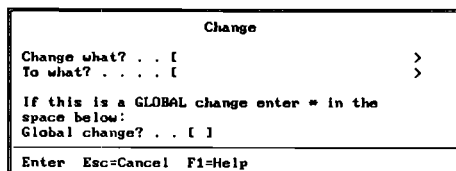
② In the text box, type the text you want System Editor to find, and press ENTER.

System Editor searches forward from the cursor to the end of the file. If you want System Editor to search the entire file, change the Search-wrap setting to On by using the Searchwrap command from the Options menu.

To find further occurrences of the specified text, repeat the procedure.

You can also search for specific text and replace it with other text by using the Change command from the Search menu. To do this, follow these steps:

[1] Select the Search menu and choose the Change command. The following dialog box appears:
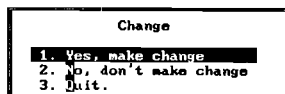
```
┌─────────────────────────────────────────────────────────┐
│                        Change                            │
│                                                          │
│ Change what? . . [                              >        │
│ To what? . . . . [                              >        │
│                                                          │
│ If this is a GLOBAL change enter * in the                │
│ space below:                                             │
│ Global change? . . [ ]                                   │
│─────────────────────────────────────────────────────────│
│ Enter  Esc=Cancel  F1=Help                               │
└─────────────────────────────────────────────────────────┘
```

[2] Type the text to be searched for in the Change What? text box. Use the DOWN key to move to the next text box.

[3] Type the replacement text in the To What? text box.

[4] If you want the replacement made for every occurrence of the text within the file, type an asterisk (*) in the Global Change? text box.

[5] Press ENTER.

[6] If you specified a global change, the replacements are made. If you did not specify a global change and the specified text is found, the following dialog box appears:

```
┌──────────────────────────────┐
│           Change             │
│ 1. Yes, make change          │
│ 2. No, don't make change     │
│ 3. Quit.                     │
└──────────────────────────────┘
```

[7] Select the appropriate option and press ENTER.

Undoing an Edit

If you change your mind after editing a line and you haven't yet moved the cursor from that line, you can cancel your last edit by doing the following:

▶ Press F9 to restore the line to the way it was before you changed it.

Pressing F9 only works if your edit consisted of typing new text (in either insert or replace mode) or deleting one character.

Changing the Name of a File

You can change the name of the file you are working in by using the Rename A File command from the Files menu. To do this, follow these steps:

1 Select the Files menu and choose the Rename A File command. The following dialog box appears:

```
┌──────────────────────────────────────────────────────┐
│                      Rename File                       │
│ Enter path and                                         │
│ filename [                                      >      │
│                                                        │
│ Enter  Esc=Cancel  F1=Help                             │
└──────────────────────────────────────────────────────┘
```

2 Type the new filename and press ENTER.

Notice that the new filename now appears in the title bar.

Using the Command Line

While you can use function keys or key combinations to carry out some of the System Editor commands, you need to type other commands on the System Editor command line. To use the command line, do the following:

▶ Press SHIFT+F9. The Command Line dialog box appears.

```
┌─────────────────────────────────────────────────────────────┐
│                         Command Line                          │
├─────────────────────────────────────────────────────────────┤
│ Enter an editor command:                                      │
│ Command . . [                                            >    │
├─────────────────────────────────────────────────────────────┤
│ Enter  Esc=Cancel  F1=Help                                    │
└─────────────────────────────────────────────────────────────┘
```
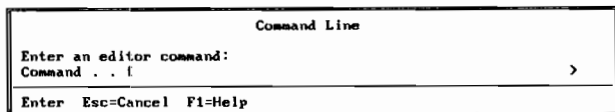
From here you can type any of the System Editor commands.

For descriptions of the System Editor commands that you can type on the command line, use Help.

Working with Multiple Files

In System Editor, you can work with several files at a time. Suppose you are editing a file in System Editor. To open a second file for editing, without quitting the active file, follow these steps:

1 Select the Files menu, and choose the Edit A File command.

2 Type the name of the file you want to work on, and press ENTER.

You now have two files open. You can switch between these files by pressing F2, to switch to the next file, or pressing ALT+F2, to switch to the previous file. When only two files are open, these commands function exactly the same way: they allow you to switch back and forth between the two files.

If you start System Editor from **cmd**, you can specify more than one file on the command line. You can then switch between these files by using the F2 and ALT+F2 keys.

To start System Editor and switch between files, follow these steps:

1 At the **cmd** prompt, type **e** *filename1 filename2 filename3* and press ENTER.

The file specified by *filename1* appears on your screen.

2 Press F2. The file specified by *filename2* now appears on your screen.

3 Press F2. The file specified by *filename3* now appears on your screen.

Pressing F2 takes you through the files in the order in which you specified them on the command line. You can go backwards through the order by pressing ALT+F2.

Displaying the Current Directory

You can display the current directory without quitting System Editor. You do this by pressing F4. You may want to do this to verify filenames before specifying them in System Editor.

Merging Files

You can merge the contents of a file with the file you are working on. To do this, follow these steps:

[1] Move the cursor to the line just above where you want the merged text to be placed.

[2] Select the Files menu and choose the Merge A File command. A dialog box appears, prompting you for the filename.

[3] Type the name of the file to be merged, and press ENTER. If the file is in another directory, type the directory path and filename.

The merged text now appears just below the cursor.

Drawing a Box

In System Editor, you can draw boxes within your data file by drawing lines and adding corners. These boxes are used for enhancing the way your file looks on the screen. Use the following key combinations to draw boxes:

To draw	Press
The top-left corner	CTRL+F1
The top-right corner	CTRL+F2
The bottom-left corner	CTRL+F3
The bottom-right corner	CTRL+F4
A horizontal bar	CTRL+F5
A vertical bar	CTRL+F6

Assigning Your Own Key Definitions

In System Editor, you can assign your own key definitions by modifying the key-definition file, E.DEF. The key-definition file is a data file that tells System Editor how to interpret a particular keystroke. For example, to assign your own key definitions, follow these steps:

[1] Using System Editor, open the E.DEF file. This is usually found in the directory C:\OS2.

[2] Using the DIRECTION keys, scroll through the file to locate the key definition that you want to change, and make the change.

[3] Save the E.DEF file and quit System Editor.

Each of the definition (def) statements defines a particular keystroke. The name of the key or key combination is to the left of the equal sign (=). The command to the right of the equal sign (=) determines the key function. The number sign (#) is a comment symbol, and the text to the right of it describes the function.

For example, suppose you want to change the key assignment for deleting the current line of text from CTRL+BACKSPACE to CTRL+D. To do this, follow these steps:

[1] Using System Editor, open the E.DEF file.

[2] Select the Search menu and choose the Locate command.

[3] Type **delete current line** in the Locate What? text box, and press ENTER. System Editor takes you to the following line:

```
def c_backspace = delete    #  delete current line
```

[4] Change **c_backspace** to **c_d**.

[5] Save the E.DEF file and quit System Editor.

Now when you use System Editor, you'll press CTRL+D to delete the current line of text.

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Using MS OS/2 Commands

You can also use MS OS/2 commands from the System Editor command line. With this feature you can use an MS OS/2 command without quitting System Editor. To use an MS OS/2 command, follow these steps:

[1] Press SHIFT+F9 to use the System Editor command line.

[2] In the Command text box, type **dos** followed by the command you want to use, and press ENTER. For example, if you want to format a disk located in drive A, you type **dos format a:** and press ENTER.

When the command is complete, you return to the System Editor screen.

Note Although you type **dos** on the System Editor command line, the commands that you can run from System Editor are MS OS/2 commands, not DOS commands. Since System Editor runs in a full-screen OS/2 session, you cannot run DOS commands from it.

Part 3

Configuring and Maintaining Your System

This part of the *Microsoft Operating System/2 User's Guide* provides information to help you configure and maintain your system.

You will find information about utilities and commands you can use to perform system-maintenance tasks, such as making backups and configuring and formatting a hard disk.

There is also an overview of the start-up files that you can use in MS OS/2.

You will learn about the configuration commands that can be added to your CONFIG.SYS file and how to use device drivers to support new hardware or enable additional features of the system.
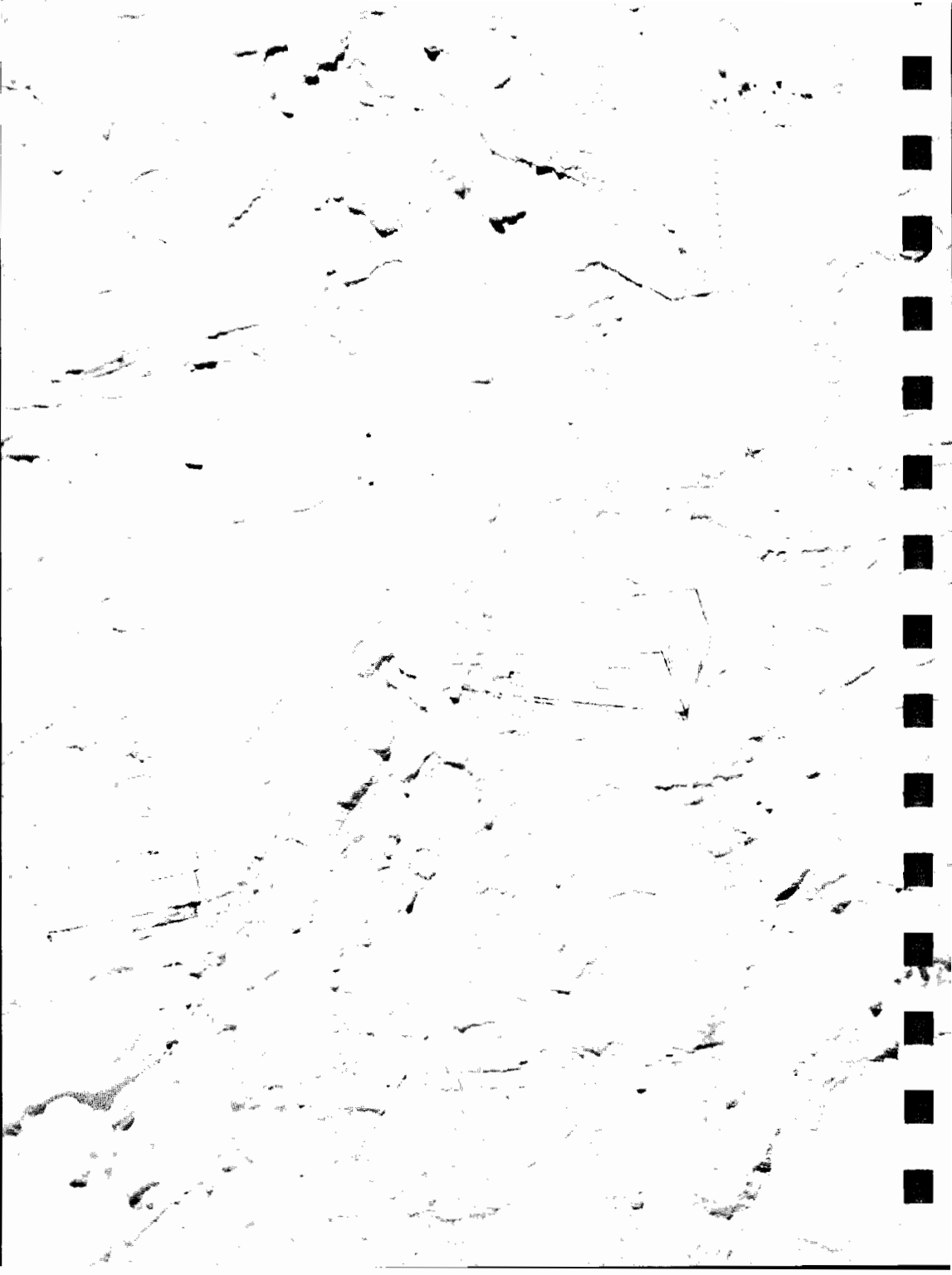
Part 3

11 Maintaining Your System

Introduction

This chapter is designed to help you with the tasks of maintaining your system, including maintaining your system's files, directories, and disks. It describes the MS OS/2 disk utilities that you use to perform such tasks as displaying information about a disk, setting up a hard-disk drive, and backing up and restoring files, and it describes how you can use the **mode** utility to give MS OS/2 information about devices that are connected to your system.

Using MS OS/2 Disk Utilities

MS OS/2 provides utilities that help you work with and maintain disks. These utilities are described as follows:

Utility	Purpose
chkdsk	Displays status information about a disk.
backup	Makes backup copies of files.
restore	Restores backup files.
recover	Recovers a file or disk that contains bad sectors.
fdisk	Sets up a hard disk.

You can run all of these utilities in both DOS and full-screen OS/2 sessions, except for the **fdisk** utility, which you can run only in a full-screen OS/2 session.

Unlike commands and utilities that operate on files and directories, disk utilities are designed to help you prepare and maintain floppy and hard disks.

Displaying Disk Information

The **chkdsk** utility displays status information about a disk and checks the disk for errors.

You should run this utility periodically to keep track of how much space is left on a disk and to display any errors found on the disk. If **chkdsk** finds an error, a message appears on the screen, describing the error.

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To run **chkdsk**, type **chkdsk** followed by a drive letter or filename. **Chkdsk** always checks a drive; you can check a file as well by specifying a filename. If you specify a filename, **chkdsk** checks the drive and also tells you whether the specified file is contiguous. (You can specify a directory path with the filename.) If you don't specify a drive, **chkdsk** checks the current drive.

For example, to check your hard disk and save the output in the file REPORT.DSK on drive A, type the following:

chkdsk c: > a:report.dsk

A typical status report might look like the following:

```
Volume RALPH created --  6-27-1989  10:47am

30377984 bytes total disk space.
     512 bytes in 1 hidden files.
   83968 bytes in 34 directories.
28644864 bytes in 959 user files.
   10240 bytes in bad sectors.
 1638400 bytes available on disk.
```

Hidden files are files that are needed by the system but do not show up when you use the **dir** command to display a directory listing. To discover the names of hidden files, use **chkdsk** with the **/v** option, which is described later in this chapter, in "Displaying Each File on Your Disk," or use File System in the Presentation Manager session.

The *bytes in bad sectors* message shows you how many of the sectors on your disk are defective. These bad sectors are taken care of by the system, so there is usually no reason to worry about bad sectors unless this number becomes very large.

The *bytes available on disk* is the number of unused bytes on the disk. You should check on this value from time to time, especially if disk space is limited.

The **chkdsk** utility may report that it has found lost clusters. To understand what this means, you must understand how MS OS/2 files are stored on a disk. MS OS/2 files are stored in a series of units called sectors, which are grouped into larger units called clusters. When **chkdsk** reports a lost cluster, it doesn't mean that the cluster is deleted. It does mean that the cluster is no longer linked to the file it was a part of. This could occur for many reasons; for example, if you pressed CTRL+ALT+DEL while the system was writing to a file. When a cluster is lost, MS OS/2 can't read, write, or modify the data in those clusters. If part of a valuable file is contained in a lost cluster, you won't be able to work with it at all. In addition, lost clusters take up valuable disk space.

If you use the **/f** option, **chkdsk** will fix those lost clusters by writing them to a file. For instructions on how to use the **/f** option, see the following section.

If you specify files to be checked when you use the **chkdsk** utility, you will receive a message that tells you whether the files are stored in contiguous sectors. If a file is not stored in contiguous sectors, the number of its blocks that are stored in noncontiguous sectors is displayed. Although not required, storing files in contiguous sectors enables your computer to read or write to files more efficiently. If many of your files are stored in noncontiguous sectors, you can make all files contiguous by making a backup copy of your disk, reformatting it, and restoring the files to the disk by using a backup utility.

Fixing Errors on Your Disk

To fix errors on your disk, use **chkdsk** with the **/f** option. You can fix errors only on a disk other than the MS OS/2 start-up disk. This means that if you normally start MS OS/2 from drive C, you can fix errors only on disks that are in drives other than drive C. To fix errors on your hard disk, you must do the following:

1. Restart your system by using the MS OS/2 Installation disk.
2. Press ESC when the first screen appears. This takes you to the [A:] prompt.
3. Insert the disk that contains the file CHKDSK.COM.
4. Type **chkdsk c: /f** and press ENTER.

The **chkdsk** utility attempts to recover lost clusters and places them into files that have the extension .CHK. Depending upon the condition of the recovered files, the files may or may not be usable.

If the files with lost clusters are ASCII files (data files), you may be able to recover the lost data. If you find that there is text missing from an ASCII file, run **chkdsk** with the **/f** option, then do the following:

1. Use the **type** command to look at the contents of each of the .CHK files.
2. If the missing text appears in one of the .CHK files, use a text editor to copy this text back into the original file.

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Displaying Each File on Your Disk

Use the /v option if you want the name of each file on the disk to be displayed as it is being checked. The /v option causes **chkdsk** to display all files, including hidden files. However, the hidden files are not flagged in any way.

Discovering which files are the hidden files can be a challenging process. If you need to know the names of your hidden files, perform the following steps:

1 Use the **chkdsk** command without the /v option. This tells you the number of hidden files; however, it does not tell you the names of the files.

2 Use the **chkdsk** command with the /v option to get a listing of all the files on a particular drive.

3 Use the **dir** command to get a file listing that doesn't show any hidden files.

4 Compare these two listings.

Any file that is in the **chkdsk** /v listing but is not in the **dir** listing is a hidden file.

Since **chkdsk** /v displays filenames left-aligned, you can easily use the **sort** utility to sort files and directories alphabetically. The **sort** utility is described in detail in Chapter 8, "Using MS OS/2 Utilities."

Making Backup Copies of Your Files

The **backup** utility creates a backup copy of one or more files from one disk and stores the backup on another disk. It provides an easy way to make backup copies of files, directories, or entire disks. Using **backup** differs from using the **copy** command or the **xcopy** utility to copy files; when you use **backup** to copy files, the contents of the files are stored in a single file, instead of in individual files. In addition, **backup** has several useful options that let you selectively make backups of specific files.

Note The **backup** utility will not make backup copies of the files CMD.EXE or COMMAND.COM, or of hidden system files.

It is also possible to make backups of files that are on one kind of disk and store the backup copies on a disk of a different kind. This means that you can make backup files in the following ways:

- Hard disk to floppy disk
- Floppy disk to floppy disk
- Floppy disk to hard disk
- Hard disk to hard disk

You can back up one floppy disk to another floppy disk even if the disks have a different number of sides or sectors.

The **backup** utility is most commonly used to make backup copies of files on your hard disk and store them on a series of floppy disks. That way, if your hard disk becomes corrupted, you have a way of recovering the files that were on it.

Making Backup Files on Another Disk

To run the **backup** utility, type **backup** followed by the drive that contains the disk that you want to back up (the source disk) and the drive that contains the disk that will hold the backup files (the backup disk).

To back up the contents of your current directory to a directory in another drive, specify the drive letters of the source drive and the backup drive. For example, to back up the root directory of drive A to your hard disk, be in the root directory and type the following:

backup a: c:

To make a backup of the contents of a specified directory, type the drive letter and directory path of the directory you want to copy. For example, to back up the files in the ORDERS subdirectory of the ACCOUNT directory to a floppy disk in drive A, type the following:

backup c:\account\orders a:

Suppose you have several files on your hard disk that have the filename extension .OLD. To back up the .OLD files to a floppy disk in drive B, type the following:

backup c:\account\orders*.old b:

By default, any files on the backup disk are erased before the backup files are added to it. If all of the files can't fit on one floppy disk, **backup** prompts you to insert another blank, formatted disk when the current disk is filled.

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When the backup is complete and you display a directory listing for the backup disk, you won't see the files you just copied listed individually. Instead, you'll see two files named BACKUP.00n and CONTROL.00n. These files contain your files and pathnames, and they will be used later to restore these files. On the first backup disk, these two files will be called BACKUP.001 and CONTROL.001; on the second disk, they will be called BACKUP.002 and CONTROL.002; and so on.

If you are copying files to a hard disk, **backup** automatically creates a directory called \BACKUP, and it will contain the BACKUP and CONTROL files.

If you use the **/f** option, **backup** formats the backup disk (floppy disks only) before making the backup.

Making Backups of Subdirectories

If you use the **backup** utility without options, only the files or directory you specify are copied. To copy several directories, or an entire disk, you can use the **/s** option. The **/s** option enables you to create backup copies of subdirectories.

For example, to back up your entire hard disk to floppy disks on drive A, type the following:

backup c: a: /s

All files and directories are copied to drive A while maintaining the original directory structure.

Making Backups of Files Modified Since the Last Backup

The **backup** utility can use the archive attribute to determine which files to back up. If you use the **/m** option, only those files that have been modified since the last backup are copied to the backup disk.

When you use **backup**, those files that have their archive attributes set are found and copied. The **backup** utility then turns off the archive attribute for these files. The next time you make a backup of the same set of files by using the **/m** option, only those files that have been created or modified since the last backup will have their archive attributes set. Thus, only they will be backed up. This is true unless you use the **attrib** utility to modify the archive attributes of certain files.

Adding Files to the Backup Disk

By default, the contents of the backup disk are erased before the source files are added to it. If you want to add files to an existing backup disk without modifying the current contents, use the **/a** option.

Suppose that your backup disk now contains the contents of the ENG directory. You later realize that you also need to make a backup copy of the MKT directory. You could make a second backup disk, or you could add the contents of MKT to the existing backup disk by using the **/a** option. To add the second directory, type the following:

backup c:mkt a: /a

The BACKUP and CONTROL files now contain the contents of the ENG backup files and the MKT backup files. Any other files that were on the backup disk remain unchanged.

Making Backups of Files Modified After a Certain Date or Time

You might be interested in copying only files that have been modified since a certain date and time. To do this, use the **/d:***date* option and, optionally, the **/t:***time* option. Note that **/t** cannot be used without **/d**.

Suppose you want to copy only files that have been modified since the beginning of 1988. You would run the **backup** utility and specify the date and time as follows:

backup c: a: /d:12-31-87 /t:23:59

Any files that were modified after 11:59 P.M. on December 31, 1987, would be copied.

Making a Backup Log

The **/L:***logfile* option lets you create a backup log of the files you have copied. This log contains a list of entries, one entry per file. Each entry contains the number of the backup disk and the name of the file. This information can be used to restore a particular file from a floppy disk.

Unless you specify otherwise, the log file is created in the root directory of the start-up drive. If you do not specify a log-file name, the log file is named BACKUP.LOG.

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For example, suppose you want to back up the contents of your current directory on drive C to a floppy disk in drive A. To create a backup log on drive A called LOGFILE, type the following:

backup c: a: /L:a:\logfile

Restoring Backup Files

To restore backup files to a disk, use the **restore** utility. The **restore** utility can restore files from similar disk types or from differing disk types. Many of the **restore** options are analogous to the **backup** options.

Restoring Files to a Disk

To restore files that were copied with the **backup** command, type **restore** followed by the drive that contains the disk where the backup files are located (the source drive) and the name of the drive or directory that these files will be copied to (the destination drive). You can restore files only to the directories from which they were backed up.

If you have a floppy disk that contains the backup files, you need only insert the disk that contains the backup files in drive A and type the following to restore the files to the directory \BAK on drive C:

restore a: c:\bak

Restoring Subdirectories

If you made backups of subdirectories by using the **backup** utility's /s option, you can restore these subdirectories by using the **restore** utility's /s option. For example, to restore the contents of all backup files in drive A to the current directory in drive C, type the following:

restore a: c: /s

Prompting the User Before Restoring Files

It's possible that the directory being restored might contain read-only files or files that have been modified since the last backup. If so, you might not want to restore these files.

The **/p** option displays a warning message and prompts the user with "Replace the file (Y/N)?" To restore the backup file, type **y** for yes. To leave the file unchanged, type **n** for no.

Selecting Files to Restore

Just as you can make backups based on the time or date a file was created or last modified, you can also restore files based on these features. The options that you can use with **restore** are as follows:

Option	Purpose
/b:*date*	Restores only those files that were last modified on or before *date*.
/a:*date*	Restores only those files that were last modified on or after *date*.
/e:*time*	Restores only those files that were last modified at or earlier than *time*.
/L:*time*	Restores only those files that were last modified at or later than *time*.
/m	Restores only those files that have been modified since the last backup.

You can combine options if you like.

These options work only if the filenames on the source drive are the same as those on the destination drive. In other words, if you are restoring files to an empty directory or to a directory that contains filenames that are different from the backup filenames, these options do not apply.

For example, suppose that you want to update a phone list periodically from a backup floppy disk that is made from the company's master phone lists. Suppose also that you want to restore the list to a directory named PHONE in drive C. To update those phone lists that haven't been modified in over a month, you could use the **/b** and **/m** options, specifying a date as follows:

restore a: c:\phone /b:5-14-89 /m

The **/b** option looks only for those files that were last modified before May 14, 1989. The **/m** option looks for those files that have the archive attribute set, which means that the file has been modified since the last backup.

Restoring Files Not on the Destination Drive

To restore only those files from the backup disk that do not already exist on the destination drive, use the **/n** option.

For example, suppose you have the files TEMP1.BAK, TEMP2.BAK, and TEMP3.BAK on a backup disk, and TEMP1.BAK and TEMP2.BAK are in the destination directory. If you use the **/n** option, only TEMP3.BAK will be restored.

Recovering Files from a Damaged Disk

If you find that a sector on your disk is damaged, you can use the **recover** utility to try to recover just the file that has been written to the damaged sector, or the entire disk.

Before using this utility, be sure that you have a full backup of all the files on your disk. Then try to restore your files by using the **restore** command. If this fails, use the **recover** utility on one file at a time. Only use **recover** on a disk if the entire disk is unreadable.

To recover one file, type **recover** followed by the name of the file you want to recover. This causes MS OS/2 to read the file sector-by-sector and to skip the bad sectors. When MS OS/2 finds a bad sector, it labels the damaged sector so that no data will be written to it in the future.

To recover an entire disk, type **recover** followed by the drive letter.

Recover will not work on a network from a remote work station, nor will it work on drives that are used with the **subst** or **join** utilities.

Configuring a Hard Disk

The **fdisk** utility sets up your hard disk for use with MS OS/2. You must always run **fdisk** on a hard disk before using it for the first time. The MS OS/2 installation program does this for you, but later, you might want to run **fdisk** to change the configuration of your disk.

The **fdisk** utility displays a series of menus that let you do the following:

- Create an MS OS/2 partition or logical drive.
- Change the active partition.
- Delete an MS OS/2 partition or logical drive.
- Display partition data or logical-drive information.
- Review or modify the configuration of another hard disk on your computer.

You should run **fdisk** if you need to change the size or number of partitions that are on your hard disk, or if you must restore lost partition information. In addition, you can run **fdisk** any time you want to find out the way your hard disk is configured.

In the following sections, specific examples are used to illustrate how **fdisk** options work. Your computer may display different values when you run **fdisk**, depending upon the size of the hard disk installed in your system.

Warning Reconfiguring your disk by using **fdisk** destroys all existing files. Be sure to have a backup copy of all the files on your disk before you run **fdisk**.

MS OS/2 Partitions and Logical Drives

A hard disk can be organized into separate sections called *partitions*. You can set up one primary and one extended partition. The extended partition is optional. The primary partition is drive C; it is where the start-up files for MS OS/2 must reside. It can also contain user files and directories. An extended partition contains user files or directories, but it cannot contain MS OS/2 start-up files. Within an extended partition, you can have one or more logical drives, each having its own drive letter (for example, D, E, and F).

Most users will want to set up their entire hard disk as the primary partition. That way they can gain access to any file and directory on the disk without having to change to a different logical drive. There are a few users, however, that may find a need to set up and use an extended partition and logical drives. If several workers are sharing one computer, for example, you could have the primary partition (drive C) reserved for system files and shared data files, and use drives D and E for individual user files.

Setting Up Your Hard Disk

If your disk is being configured for the first time, you may need to perform the following steps. The MS OS/2 installation program performs these steps for you. These steps are described in the following sections.

1 Set up the primary (start-up) partition.
2 Optionally, set up the extended partition and logical drives.
3 Restart your system to make the changes permanent.
4 Format drive C and any logical drives you have created.

To find out whether your hard disk has already been configured for MS OS/2, try to start MS OS/2 from your hard disk. If it starts, your hard disk is both configured and formatted, and the MS OS/2 system files are on the disk. If MS OS/2 does not start, your disk is not formatted to start MS OS/2, but it may have been configured. Check to see whether the disk has been configured by using the **fdisk** command and then selecting the Display the Partition Data option. This procedure is discussed in greater depth later in this chapter.

Starting the Fdisk Program

The **fdisk** utility is easy to use because it uses menus that lead you through each procedure. Before starting **fdisk**, make sure that you have inserted the MS OS/2 Installation disk in drive A and started your computer, and that the Installation disk contains the file FDISK.COM. You cannot run **fdisk** if you start MS OS/2 from the hard disk.

To start **fdisk**, follow these steps:

1 Place the MS OS/2 Installation disk in drive A.
2 Turn on your computer. If your computer is already turned on, restart your computer by pressing CTRL+ALT+DEL.
3 When the logo appears, press the ESC key. This takes you to the command prompt.
4 Type the following at the prompt and press the ENTER key:

fdisk

In response to your typed command, the **fdisk** utility displays the FDISK Options menu on your screen. This menu lists five options (if your computer has only one hard disk, the fifth option will not appear on your screen).

```
FDISK options

Choose one of the following:

    1. Create a Microsoft Operating System/2 partition
       or a logical drive
    2. Change the active partition
    3. Delete a Microsoft Operating System/2 partition
       or a logical drive
    4. Display the partition data
    5. Select Next Fixed Disk Drive

Enter choice: [1]

Press Enter to continue or
Esc to return to Microsoft Operating System/2
```

Most of the **fdisk** menus display a default value. To choose the default value, press ENTER. To choose another value, just type the value you want and press ENTER.

The following sections describe each of the **fdisk** menu options and show the menus and other information they display. To return to MS OS/2 from the FDISK Options menu, press the ESC key. You can also use the ESC key to return to the FDISK Options menu from any of the other **fdisk** menus.

To quit **fdisk**, return to the FDISK Options menu and press ESC. If you have created any partitions or logical drives, or if you have changed the active partition, you'll see the following message displayed on your screen:

```
The fixed disk has been updated. The system should
now be restarted. Press Ctrl+Alt+Del.
```

You must restart your system to make the changes permanent. In addition, if you have created any partitions or logical drives, you must format them with the **format** utility before copying any files to them.

Creating the Primary MS OS/2 Partition

The first step in configuring a hard disk is to create a primary partition. You will most likely want your entire hard disk to be in the primary partition, although this is not required.

When you create a primary partition, no partitions must currently exist on the hard disk. This means that if you want to change the size of the primary partition, you must first delete existing partitions and logical drives, then create a new primary partition (see "Deleting an MS OS/2 Partition," later in this chapter, for instructions on deleting partitions). You must create a primary MS OS/2 partition before you can create an extended MS OS/2 partition.

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To create the primary MS OS/2 partition, select option 1 from the
FDISK Options menu and press ENTER. **Fdisk** displays the following
screen:

```
Create a Microsoft Operating System/2 partition

Choose one of the following:

    1. Create primary Microsoft Operating System/2 partition
    2. Create extended Microsoft Operating System/2 partition

Enter choice: [1]

Press Esc to return to FDISK Options
```

To create the primary MS OS/2 partition, press ENTER to accept the
default selection (option 1).

The Create Primary Partition menu appears next. You will see the fol-
lowing message:

```
Do you want to create an active Microsoft Operating System/2
partition of the maximum size (Y/N).........? [Y]
```

If you want to have the entire hard disk in the primary MS OS/2 parti-
tion, press ENTER to accept the default selection (yes).

If you want to create a primary MS OS/2 partition that is smaller than
the maximum size, type **n** for no. The **fdisk** utility displays the maxi-
mum capacity of your hard disk (in cylinders), and prompts you for the
size you want your primary partition to be.

```
Create Primary Microsoft Operating System/2 Partition

The maximum capacity of the fixed disk is 732 cylinders.

Enter partition size.........: [ 730]

No partitions are defined

Press Esc to return to the FDISK Options
```

Type the size of the partition (in cylinders) and press ENTER.

Then **fdisk** displays status information about the partition it just created
and tells you that the primary partition has been created by displaying
the following:

```
Create Primary Microsoft Operating System/2 Partition

Partition  Status   Type  Start  End  Size
   1     C:     A    PRI DOS    2   601   600

The maximum capacity of the fixed disk is 732 cylinders.

The primary Microsoft Operating System/2 partition is created

Press Esc to return to the FDISK Options
```

You'll see the number and drive, status, and type of the partition; the
partition's starting and ending cylinder numbers; and the partition's size
(in cylinders). For a detailed description of each of these fields, see
"Displaying Partition Data," later in this chapter.

After you create the primary partition, press ESC to return to the
FDISK Options menu. If you want to create an extended partition, see
the instructions found in the following section. Otherwise, you should
restart your computer by inserting your MS OS/2 start-up disk in drive
A and pressing CTRL+ALT+DEL. This makes the partition information
permanent. Before MS OS/2 can use your hard disk, you need to for-
mat the disk by typing the following:

format c:

Remember that formatting your disk destroys all data on it. Make
backup copies of your disk as necessary.

Creating an Extended Partition

You may choose to create a primary MS OS/2 partition that is smaller
than the maximum size and then use the remainder of the disk as an
extended MS OS/2 partition.

To create an extended partition, return to the FDISK Options menu
and select option 1.

The Create Partition menu will appear on your screen:

```
Create Microsoft Operating System/2 Partition

   1. Create primary Microsoft Operating System/2 partition
   2. Create extended Microsoft Operating System/2 partition

Enter choice: [1]

Press ESC to return to the FDISK Options
```

Select option 2 to create an extended MS OS/2 partition.

When you select option 2, the **fdisk** utility displays status information
about the primary partition and prompts you as follows:

```
Create Extended Microsoft Operating System/2 Partition

Partition  Status   Type  Start  End  Size
1:     C       A     PRI DOS   2   601   600

The maximum capacity of the fixed disk is 732 cylinders.

Enter partition size............ [ 130]

Press Esc to return to the FDISK Options
```

The partition size shown in square brackets is the number of cylinders
left for your extended partition. In most cases, you'll want to use the
maximum value. Press ENTER if you want this value; otherwise, type the
size (in cylinders) that you want for the partition, then press ENTER.

Fdisk then displays status information about the primary partition and
the extended partition that you just created. To display the Create Logi-
cal Drive(s) menu, press ESC once; to return to the FDISK Options
menu, press ESC twice.

Creating Logical Drives on the Extended Partitions

After you create an extended partition, you should create logical drives
for it. You may designate the entire extended partition as one logical
drive, or you may divide it into many logical drives. If you have one
physical drive, drive C, the first logical drive you may designate is
called drive D, the second is called drive E, and so on. Logical drives
can be a good organization tool. You could, for example, have different
applications and their data files on separate logical drives.

If you are adding logical drives to an existing partition, select option 1
from the FDISK Options menu to display the Create Partition menu,
then select option 3 to display the Create Logical Drive(s) menu. If you
are creating a logical drive for a new extended partition, this menu is
automatically displayed after you create the new extended partition.

```
Create Logical Drive(s)

The total partition size is 130 cylinders.

The maximum contiguous space available for
the logical drive is  130 cylinders.

Enter the size of the logical drive.........: [ 130]

Press Esc to return to the FDISK Options.
```

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If you are adding logical drives to the extended partition, **fdisk** displays the current drive assignments as well as prompting you for new logical drive information. For example, if logical drive D already exists, you might see the following:

```
Create Logical Drive(s)

Drive   Start   End  Size
D:        602   651    50

The total partition size is 130 cylinders.
The maximum contiguous space available for
the logical drive is  80 cylinders.

Enter the size of the logical drive............ [ 80]

Press Esc to return to FDISK Options.
```

The value in square brackets is the number of unused cylinders in the extended partition. Press ENTER to accept the default value listed in the square brackets. Otherwise, type in the number of cylinders for the logical drive and press ENTER.

If any cylinders remain in the extended partition, you will be prompted again for the size of the next logical drive. The **fdisk** utility will continue to prompt you until you run out of space in the extended partition or until you press ESC to return to the FDISK Options menu.

After you create logical drives in the extended partition, you should restart your computer by inserting your MS OS/2 Installation disk in drive A and pressing CTRL+ALT+DEL. This makes the logical-drive information permanent. Then, so that MS OS/2 can use your hard disk, format your disk by typing the following:

format *drive***:**

The *drive* argument is the logical drive you just created. Repeat this format operation for every logical drive you have created. (You can create all the logical drives you need, then restart your system and format them all, one after the other.)

Changing the Active Partition

If you choose option 2 on the FDISK Options menu, to change the active partition, **fdisk** displays a screen showing the status of each partition on your hard disk. The active partition, indicated in the Status column by the letter A, is the partition from which MS OS/2 starts when you turn on or restart your computer. If you have created a partition on your disk that contains another operating system, this menu allows you to make that partition the active partition. Only one partition can be active at a time.

For example, if you have partitions for both XENIX® and MS OS/2 on your disk, the Change Primary Partition screen might look like this:

```
Change the active partition

Partition  Status    Type    Start  End   Size
1     C        A     PRI DOS    2    601   600
2              N     XENIX    602    731   130

Total disk space is 732 cylinders.

Enter the number of the partition you
want to make active..................: [1]

Press ESC to return to FDISK Options.
```

Type the number of the partition that you want to make active, and press ENTER. The default setting is the number of the currently active partition.

If your hard disk contains only MS OS/2 partitions, **fdisk** displays the following message instead of prompting you for the partition that you want to activate:

```
The only start-up partition on Drive 1
is already marked active.

Press ESC to return to FDISK Options.
```

Note   If want to run an operating system other than MS OS/2 from your hard disk, see the other operating system's manual for instructions on how to install and configure that operating system.

Deleting an MS OS/2 Partition

The **fdisk** utility lets you delete a primary partition, extended partition, or logical drive. To delete a primary partition, you must first delete the extended partition. To delete an extended partition, you must first delete any logical drives on it.

The **fdisk** utility doesn't allow you to change the size of a partition. Therefore, if you need to change the size of a partition, you must first delete the partition, then create a new partition that has the new size.

Note   Be sure to make backup copies of all files before you delete the drive. When **fdisk** deletes a logical drive or partition, the data on it is destroyed.

If you select option 3 on the FDISK Options menu, to delete an MS OS/2 partition, the **fdisk** utility displays the Delete Partition menu:

```
Delete Microsoft Operating System/2 Partition

    1. Delete Primary Microsoft Operating System/2 partition
    2. Delete Extended Microsoft Operating System/2 partition
    3. Delete the logical drive(s)
       in the Extended Microsoft Operating System/2 Partition

Enter choice: [1]

Press ESC to return to FDISK Options;
```

Option 3 will not appear if you have not created logical drives.

Type the number of the option you want, and press ENTER. If you've chosen to delete a primary or an extended partition, the next menu shows the status of that partition. If you are deleting a logical drive, the drives currently defined are displayed.

Deleting a Logical Drive

To delete a logical drive, select option 3 from the Delete Partition menu. The **fdisk** utility then displays status information about the existing partitions and prompts you as follows:

```
Delete the Logical Drive

Drive   Start   End   Size
D:        602   651    50
E:        652   731    80

Total partition size is 130 cylinders.
Warning!  Data in the logical drive will be lost.
What drive do you want to delete..........?   [ ]

Press ESC to return to FDISK Options
```

Type the letter of the drive you want to delete, and press ENTER.
The **fdisk** utility displays the following message:

```
Are you sure........................? [N]
```

If this logical drive contains valuable data that you have not made
backup copies of, press ENTER. This stops **fdisk** from deleting the logi-
cal drive.

To delete the drive, type **y** for yes. After deleting a drive, **fdisk** will
continue to prompt you for more logical drives to delete, until all drives
are deleted or until you press ESC. Once you press ESC, status informa-
tion for the remaining logical drives is displayed.

If you do not delete logical drives in the reverse order in which they
were created, the remaining drives are reordered starting from drive D.
So if you had created drives D, E, and F, and you delete drive D first,
drives E and F will be reordered and renamed drive D and drive E.

Deleting the Extended Partition

To delete the extended partition, select option 2 from the Delete Parti-
tion menu. Partition status information appears on the screen and you
are prompted as follows:

```
Delete Extended Microsoft Operating System/2 Partition

Partition  Status  Type     Start  End  Size
1    C       A     PRI DOS     2    601  600
2            N     EXT DOS   602    731  130

Warning! Data in the Extended Microsoft Operating
System/2 partition will be lost. Do you want
to continue..............? [N]
```

If you want to prevent the partition from being deleted, press ENTER.
You will then be returned to the FDISK Options menu.

If you want to delete the partition, type **y** for yes. A message will
appear on the screen, confirming that the partition has been deleted.
It will also provide partition status information. Notice that only the
primary partition now exists. To return to the FDISK Options menu,
press ESC.

Deleting the Primary Partition

To delete the primary partition, select option 1 from the Delete Parti-
tion menu. Partition status information appears on the screen and you
are prompted as follows:

```
Delete Primary Microsoft Operating System/2 Partition.

Partition  Status  Type   Start  End  Size
1    C: A    PRI    DOS       2  601  600

Warning! Data in the Primary OS/2 partition
will be lost. Are you sure you want to continue.....? [N]

Press ESC to return to FDISK Options
```

If you do not want to delete the primary MS OS/2 partition, press
ENTER to accept the default value (no).

Displaying Partition Data

If you choose option 4 on the FDISK Options menu, **fdisk** displays a
screen that contains information about each of the partitions on your
hard disk.

The Display Partition Information screen contains the following infor-
mation:

```
Display Partition Information

Partition  Status   Type  Start  End  Size
1    C: A    PRI     DOS      2  601  600
2           N     EXT DOS  602  731  130

Total disk space is 732 cylinders.

The Extended Microsoft Operating System/2 partition
contains logical drives. Do you want to display
the logical drive information?.........? [Y]

Press ESC to return to FDISK Options.
```

This screen identifies the partitions on your disk. It shows the number of each partition, its status, and its type. The screen also shows each partition's starting and ending cylinder numbers, in addition to its size (in cylinders). The following list explains the fields of partition information that you see:

- The Partition field tells you the partition number and drive name. The primary MS OS/2 partition is drive C.
- The Status field tells you whether the partition is active (A) or not active (N). The primary partition must be active if you want to start MS OS/2 from it.
- The Type field tells you whether this is the primary (PRI DOS) or extended (EXT DOS) partition. If you have installed another operating system, its name will appear in this field.
- The Start and End fields tell you the cylinder numbers where each partition starts and ends, respectively.
- The Size field tells you the total size of the partition (in cylinders).

If you have an extended partition, the **fdisk** utility asks whether you want to see information about that partition's logical drives. Type **y** for yes and press ENTER to display a screen similar to the following: following:

```
Drive    Start    End    Size
D:         602    651      50
E:         652    731      80

Press ESC to return to FDISK Options
```

Press the ESC key to return to the FDISK Options menu.

Selecting the Next Hard-Disk Drive

The fifth option, Select Next Fixed Disk Drive, appears on the FDISK Options menu if you have more than one hard disk attached to your computer. If you choose this option, **fdisk** switches the current disk drive to the next hard-disk drive.

For example, if the current drive is drive C, and if you choose option 5 on the FDISK Options menu, **fdisk** changes the current drive to drive D. You could then choose any of the first four **fdisk** options to prepare the second hard disk for MS OS/2. Or you could select option 5 once again to select the next drive; if there is not a third hard disk, **fdisk** changes the current hard drive from D back to C.

After you have selected the next drive, **fdisk** displays the FDISK Options menu again. This time the information reported is for your second hard disk.

Specifying Device Information

To specify or change the settings for a device in your system, use the **mode** utility. You can change settings for a parallel printer, a display device, or asynchronous communications devices such as modems and terminals.

Before using devices that are set with the **mode** utility, make sure that the proper device drivers and devices are installed. For more information about MS OS/2 device drivers, see Chapter 14, "Using MS OS/2 Device Drivers."

For complete information about the options to the **mode** utility, see the *Microsoft Operating System/2 Desktop Reference*.

Setting Operating Arguments for Devices

The **mode** utility prepares MS OS/2 for communication with devices such as parallel and serial printers, modems, and screens. You can also use it to redirect output.

To use the **mode** utility, you must tell it the name of the device you want to use, followed by a list of operating parameters. MS OS/2 assigns names to devices as follows:

- LPT1, LPT2, and LPT3 are parallel printers attached to your computer's parallel ports. If you don't specify a port, MS OS/2 assumes that you are using only LPT1. PRN can be used in place of LPT1.
- COM1, COM2, and COM3 are serial devices that are attached to your computer's serial communication ports. These could include devices such as modems or serial printers.

Before you can set operating arguments for these devices, the device must be installed correctly and the appropriate device driver must be installed. For instructions on how to install device drivers, see Chapter 14, "Using MS OS/2 Device Drivers."

Setting Parallel-Printer Modes

You can use the **mode** utility to set up characteristics for parallel printers connected to parallel ports LPT1, LPT2, and LPT3. PRN and LPT1 can be used interchangeably.

To set the operating arguments for a parallel port, type **mode** followed by the following parallel-printer options:

Option	Purpose
lpt*n*	Specifies the printer number: 1, 2, or 3. The default value is 1.
chars	Specifies the number of characters per line: 80 or 132. The default value is 80.
lines	Specifies vertical spacing (lines per inch): 6 or 8. The default value is 6.
p	Specifies that the **mode** utility try continuously to send output to the printer if a time-out error occurs. This option causes part of the mode utility to remain resident in memory. You can break out of a time-out loop by pressing CTRL+C.

As an example, suppose that you want your computer to print to a parallel printer that is connected to your computer's second parallel-printer port (LPT2). If you want to print with 132 characters per line and 8 lines per inch, type the following:

mode lpt2: 132,8

Setting Asynchronous-Communication Modes

You can use the **mode** utility to configure a specified serial port for communication with an external device such as a printer, terminal, or modem.

To display the status of a serial device, type **mode** followed by the name of the asynchronous port. For example, to see the status of the device that is connected to COM2, type the following:

mode com2

To set the operating arguments for a serial port, type **mode** followed by a combination of the following options:

Option	Purpose
com*n*	Specifies the asynchronous-communications (COM) port number. The range of valid values depends on your particular computer. The default value is 1.
baud	Specifies the transmission rate. Valid rates are 110, 150, 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, 9600, or 19200. You may use just the first two digits to specify the rate.
parity	Specifies the parity: N (none), O (odd), E (even), M (mark; the parity equals 1), or S (space; the parity equals zero). The default value is E, which denotes even parity.
databits	Specifies the number of data bits: 5, 6, 7, or 8 bits of data. The default value is 7.
stopbits	Specifies the number of stop bits: 1, 1.5, or 2. If *baud* is 110, the default value is 2; otherwise, the default value is 1. If you specify 1.5 stop bits, *databits* must be 5.

You must set the *baud* option; all other arguments are optional.

The **to, xon, idsr, odsr, octs, dtr,** and **rts** options are used only when you use the **mode** utility in a full-screen OS/2 session. These options may be listed in any order following the *stopbits* argument.

Option	Purpose
to=*state*	Specifies whether infinite time-out processing is enabled (on) or whether normal time-out processing is to be used (off). The default is **to=on**.
xon=*state*	Specifies whether automatic transmit-flow control is enabled (on) or disabled (off). The default is **xon=off**.
idsr=*state*	Specifies whether the input handshake using DSR (data set ready) is enabled (on) or disabled (off). The default is **idsr=on**.

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odsr=*state*	Specifies whether the output handshake using DSR (data set ready) is enabled (on) or disabled (off). The default is **odsr=on**.
octs=*state*	Specifies whether the output handshake using CTS (clear to send) is enabled (on) or disabled (off). The default is **octs=on**.
dtr=*state*	Specifies whether DTR (data terminal ready) is enabled (on) or disabled (off), or whether DTR handshaking is enabled (hs). The default is **dtr=on**.
rts=*state*	Specifies whether RTS (request to send) is enabled (on) or disabled (off), or whether RTS handshaking is enabled (hs) or RTS toggling is enabled (tog). The default is **rts=on**.

You use the **p** option only when you use the **mode** utility in the DOS session. The **p** option follows the *stopbits* argument.

Option	Purpose
p	Specifies that the **mode** utility is using the COM port for a serial printer and that it is continuously retrying if time-out errors occur (in the DOS session only).

As an example of using **mode** to configure a serial communications port, suppose you want to set up the COM2 port for 9600 baud, with even parity, 7 data bits, and 1 stop bit. To do so, type the following:

mode com2: 9600

In this example, the parity and number of data and stop bits were not specified since the default values were used. If, on the other hand, you want to set up the COM2 port for 1200 baud, odd parity, 7 data bits, and 2 stop bits, type the following:

mode com2: 1200,o,,2

For your device to work, the operating arguments of your serial port must match those of the device with which you want to communicate.

Setting Display Modes

You can use the **mode** utility to select the active graphics adapter and its display mode, or to change the way information is displayed on your screen.

You can use the following options with the **mode** utility to set the display mode:

Option	Purpose
display	Specifies one of the following values: 40, 80, BW40, BW80, CO40, CO80, or MONO. For each of these values, 40 and 80 indicate the number of characters per line. BW and CO refer to a color graphics adapter with color disabled (BW) or enabled (CO). MONO specifies a monochrome adapter with a constant display width of 80 characters per line.
rows	Specifies the number of rows per screen: 25, 43, or 50. The adapter type determines which of these values are valid. The initial value is 25; the default value is the last value that you set.

When you type the **mode** command with the *display* argument, the command affects the current session only.

Suppose your computer uses an 80-character-per-line color graphics adapter (CO80). To change the number of rows per screen from the default (25) to 43, type the following:

mode co80,43

12 Using Start-up Files in MS OS/2

Introduction

Whenever you start or restart your system, MS OS/2 looks for various start-up files for information about how to start your system. There are different start-up files for the different parts of MS OS/2: the AUTOEXEC.BAT batch file provides information for the DOS session and the STARTUP.CMD batch file is for a full-screen OS/2 session, while the CONFIG.SYS file provides information for the entire working environment. You can personalize your MS OS/2 working environment by using these start-up files.

This chapter briefly describes how to use the various start-up files in MS OS/2.

AUTOEXEC.BAT

The AUTOEXEC.BAT batch file is used for customizing the DOS session in MS OS/2. Within this file you can change your DOS command prompt, create your own batch commands, or tell MS OS/2 to automatically run certain commands when you start the DOS session.

AUTOEXEC.BAT is created during MS OS/2 installation, and is located in the root directory of your start-up drive. It is run the first time you start the DOS session.

For more information about how to use AUTOEXEC.BAT and the DOS session, see Chapter 9, "Using the DOS Session."

CONFIG.SYS

When you start or restart your system, MS OS/2 runs the CONFIG.SYS file, an ASCII file that contains start-up information. When CONFIG.SYS is run, MS OS/2 looks in the file for the **protshell** command. The **protshell** command specifies what user interface and initialization file to use, as well as which command interpreter to use in a full-screen session.

A CONFIG.SYS file is created during MS OS/2 installation, and the following **protshell** command is placed there:

protshell=c:\os2\pmshell.exe c:\os2\os2.ini c:\os2\cmd.exe

This command specifies PMSHELL.EXE (Presentation Manager) as the user interface, OS2.INI as the initialization file, and **cmd** as the command interpreter to use in a full-screen session.

▨▨▨▨▨ The OS2.INI initialization file (a binary file) contains information that MS OS/2 uses when it starts Presentation Manager, including the program names, group names, and search paths used in Start Programs. Whenever you customize Start Programs or make changes through Control Panel, the new information is saved in the OS2.INI file. If something happens to your OS2.INI file, and you need to replace it, follow these steps:

[1] Insert MS OS/2 Disk 3 in drive A.

[2] Turn on your computer. If your computer is already turned on, restart your computer by pressing CTRL+ALT+DEL.

[3] At the first screen, press ESC. This takes you to the command prompt.

[4] Type the following:

del c:os2.ini

[5] Type the following:

copy a:os2.ini c:\os2

[6] Remove the MS OS/2 disk from drive A, and restart your computer by pressing CTRL+ALT+DEL.

For more information about **cmd**, the OS/2-session command interpreter, see Chapter 7, "Running Cmd."

The CONFIG.SYS file contains other commands that customize your system. For a list of the contents of CONFIG.SYS and for information about how to use configuration commands, see Chapter 13, "Using MS OS/2 Configuration Commands."

Other Start-up Files

The CONFIG.SYS file is the primary start-up file for the Presentation Manager, full-screen OS/2, and DOS sessions. While CONFIG.SYS is usually the only start-up file you will need, you can create other start-up files to further customize the **cmd** working environment. There are two **cmd** start-up files you can create:

■ The STARTUP.CMD batch program, which initializes **cmd** the first time it is started

■ A separate batch program that can initialize **cmd** when it is started on successive occasions

Both types of batch programs are described in the following sections.

Calling STARTUP.CMD

When you start or restart your system, MS OS/2 searches for the STARTUP.CMD file in the root directory of the start-up drive. If found, STARTUP.CMD starts to run, and it automatically creates the first **cmd** session. As in other batch files, you can place batch commands, **cmd** commands, utilities, and programs in the STARTUP.CMD file.

Remember that STARTUP.CMD is run only when you start or restart your computer. To initialize other **cmd** sessions, you must create a separate batch program that the command interpreter calls to initialize the new **cmd**.

Calling a Batch Program from Cmd

One of the features of the **cmd** program is that it can call another program. By using this feature, you can have **cmd** call an initialization program each time it is run.

To do this, modify the **protshell** configuration command in the CONFIG.SYS file so that a batch program is run any time you start **cmd**. Do this by specifying the **/k** option followed by the name of the batch program.

For example, suppose that whenever you run **cmd** you want to have your command prompt appear in a special, customized form. You create a batch file that contains the command necessary to set your prompt the way you want it to appear, and specify the name of that batch file on the **protshell** command line in the CONFIG.SYS file.

If the batch file in this example is named OS2INIT.CMD, add the following line to your CONFIG.SYS file:

protshell=c:\os2\pmshell.exe c:\os2\os2.ini c:\os2\cmd.exe /k c:\os2\os2init.cmd

(This should all be typed on one line, even though it appears as two lines here.) This example causes the OS2INIT.CMD batch program to run when **cmd** is started. OS2INIT.CMD can contain any combination of batch-program commands. For more information about the **protshell** command, see Chapter 13, "Using MS OS/2 Configuration Commands."

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13 Using MS OS/2 Configuration Commands

Introduction

When you start MS OS/2, your system reads configuration commands from the CONFIG.SYS file on your system disk. These commands give the operating system information about your particular system setup, or configuration. This chapter discusses the MS OS/2 configuration commands. Even though most users will never need to change their CONFIG.SYS file, this chapter describes command form and provides examples of how you might use the commands. For more information about the individual configuration commands, see the *Microsoft Operating System/2 Desktop Reference.*

During installation, MS OS/2 creates the CONFIG.SYS file for you. Also during installation, you are given the opportunity to view the default values assigned to some of the configuration commands, as well as to modify some of those values. Once the installation is completed, the recommended way to change any command values is to run the installation program again or use System Editor or another text editor to edit your CONFIG.SYS file.

If MS OS/2 detects an error in the CONFIG.SYS file, it displays an error message, then pauses until you press ENTER. If you do not want MS OS/2 to pause after displaying a CONFIG.SYS error message, add the following command to your CONFIG.SYS file:

pauseonerror=no

Now, MS OS/2 still displays the error message, but does not pause before processing the CONFIG.SYS file.

Defining the MS OS/2 Configuration

In order to run MS OS/2, there are certain configuration commands that are required in your CONFIG.SYS file. During installation, MS OS/2 adds these required commands to your CONFIG.SYS file. The following list shows you what the CONFIG.SYS file might look like after MS OS/2 installation:

```
protshell=c:\os2\pmshell.exe c:\os2\os2.ini c:\os2\cmd.exe
set path=c:\os2;c:\os2\system;c:\os2\install;c:\;
set dpath=c:\os2;c:\os2\system;c:\os2\install;c:\;
libpath=c:\os2\dll;c:\;
set comspec=c:\os2\cmd.exe
set prompt=$i[$p]
buffers=30
iopl=no
diskcache=64
maxwait=3
```

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```
memman=swap,move
protectonly=no
swappath=c:\os2\system 512
threads=128
shell=c:\os2\command.com /p
break=off
fcbs=16,8
rmsize=640
country=001,c:\os2\system\country.sys
devinfo=kbd,us,c:\os2\keyboard.dcp
codepage=437,850
device=c:\os2\pmdd.sys
devinfo=scr,ega,c:\os2\viotbl.dcp
device=c:\os2\ega.sys
device=c:\os2\com01.sys
```

The following list tells you how the various configuration commands in this example work:

Command	Purpose
protshell	Specifies the MS OS/2 user interface (the protected-mode shell) and the MS OS/2 command interpreter.
set path	Specifies a search path for **cmd**.
set dpath	Specifies a data search path; used by various programs.
libpath	Specifies the location of dynamic-link libraries.
set comspec	Specifies the location of **cmd**.
set prompt	Determines the appearance of the command prompt.
buffers	Specifies the number of disk buffers in memory.
iopl	Disables input and output privilege levels.
diskcache	Enables disk caching, and specifies the disk-cache size.
maxwait	Specifies the maximum amount of time any active process must wait before being run.
memman	Specifies whether memory swapping and moving is permitted.
protectonly	Determines whether MS OS/2 will run a DOS session as well as a full-screen OS/2 session.
swappath	Specifies the location of the disk-swap file and the minimum free space in kilobytes.
threads	Specifies the number of threads created when you start your system.
shell	Specifies the DOS command interpreter; used in the DOS session.

break	Tells MS OS/2 to check for the key combination CTRL+C during a process; used in the DOS session.
fcbs	Specifies the maximum number of open file-control blocks; used in the DOS session.
rmsize	Determines the amount of memory reserved for DOS (real-mode) applications; used in the DOS session.
country	Defines country-dependent information such as time, date, and currency conventions.
devinfo	Gives a device the information it needs to use a particular code page.
codepage	Specifies which code pages your system is prepared to use.
device	Sets up a device driver.

Modifying Configuration-Command Values

If you modify your CONFIG.SYS file, it's likely that you'll be making additions or substitutions. You can modify the CONFIG.SYS file using your favorite text editor in either the DOS session or a full-screen or Presentation Manager session. Changes take effect after you restart your system. Any time you make changes to the CONFIG.SYS file, you should first make a backup copy of the file.

The backup copy of the CONFIG.SYS file is useful if you make a change that causes an error and prevents your system from starting correctly. If you create such an error, follow these steps to start your system:

1. Insert the MS OS/2 Installation disk in drive A.
2. Turn on your computer. If your computer is already turned on, restart your computer by pressing CTRL+ALT+DEL.
3. At the first screen, press ESC. This takes you to the command prompt.
4. Copy your backup CONFIG.SYS file to CONFIG.SYS.
5. Remove the Installation disk from drive A, and restart your computer by pressing CTRL+ALT+DEL.

It is important to note that most users will never need to change the values in the CONFIG.SYS file and that it is recommended that you not do so. However, the information provided in this chapter should help you to understand how the various commands work.

Setting Up the Presentation Manager Session

This section describes the configuration commands that set up the Presentation Manager session. With these commands you set up the MS OS/2 user interface and specify the location of dynamic-link libraries. The following commands are described:

■ **libpath**
■ **protshell**
■ **iopl**

Specifying the Location of .DLL Files

You tell MS OS/2 where the dynamic-link library modules are located by using the **libpath** command. MS OS/2 is, in part, made up of dynamic-link library modules. The filenames of these modules end with the extension .DLL, and the files contain functionally-related portions of the operating system. For example, a module named DISPLAY.DLL contains an MS OS/2 display driver.

Suppose, for example, that you have a new dynamic-link library that you've put into the LIB directory on drive C. You need to add this information to the **libpath** command in your CONFIG.SYS file. Add the following line to your CONFIG.SYS file:

libpath=c:\os2\dll;c:\;c:\lib

This example directs MS OS/2 to look for dynamic-link libraries in the root directory, the C:\OS2\DLL subdirectory, and the C:\LIB directory on your hard-disk drive.

Note There are differences between the **libpath** command and the **set path** command. The **libpath** command lists each of the directories where .DLL files are located. The **set path** command specifies an environment variable and a directory search path. Also, with the **libpath** command, the current directory is not searched first, as it is with **set path**.

Changing the User Interface

You use the **protshell** command to specify the user interface (the protected-mode shell) and the MS OS/2 command interpreter. The user interface is the program you see when you start your system.

During installation, MS OS/2 places the following **protshell** command in your CONFIG.SYS file:

protshell=c:\os2\pmshell.exe c:\os2\os2.ini c:\os2\cmd.exe

In this example, the user interface is PMSHELL.EXE, the Presentation Manager shell. For more information about this command, see Chapter 12, "Using Start-up Files in MS OS/2."

Specifying the Presentation Manager Device Driver

When you specify the Presentation Manager shell, you must also specify the Presentation Manager device driver. You do this by adding the **device=c:\os2\pmdd.sys** command to your CONFIG.SYS file. This command is placed in your CONFIG.SYS file during the installation of MS OS/2. If for some reason this command does not exist in your CONFIG.SYS file, you can add it by following these steps:

1. Insert the MS OS/2 Installation disk in drive A.
2. Turn on your computer. If your computer is already turned on, restart your computer by pressing CTRL+ALT+DEL.
3. At the first screen, press ESC. This takes you to the command prompt.
4. Using a text editor, add the following line to your CONFIG.SYS file:

   device=c:\os2\pmdd.sys

5. Remove the Installation disk from drive A, and restart your computer by pressing CTRL+ALT+DEL.

Enabling Input and Output Privilege Levels

You enable or disable input and output privilege levels by using the **iopl** configuration command.

The privilege level assigned to a program determines what data segments it can access, as well as which machine instructions it can execute. Applications are usually assigned privilege level 3, which allows them to reference only their own data segments and restricts them from issuing input/output instructions.

Applications that are assigned privilege level 2 can be granted input/output privilege. When you specify **iopl=yes,** a program that has been assigned privilege level 2 is allowed to send or receive the machine instructions necessary to access a particular input/output device.

For example, to grant a program named Payroll access to a particular piece of hardware, add the following command to your CONFIG.SYS file:

iopl=payroll

The **iopl** command does not affect programs that are running in the DOS session.

It is not necessary for you to specify **iopl=no,** since **no** is the default value.

Setting Up the DOS Session

This section describes the configuration commands that customize the DOS session. In most cases, the default initialization values should not be changed. The only times you will need to modify these values are when you want to create a customized work environment, or when an application requires you to so do.

You can further customize the DOS session by adding commands to your AUTOEXEC.BAT file.

Enabling the DOS Session

By default, whenever you start MS OS/2 the DOS session is enabled. This is controlled by the **protectonly** configuration command in your CONFIG.SYS file. The following rules apply to setting up the DOS session:

■ If you specify **protectonly=no,** the DOS session can be started. If you do not place a **protectonly** command in your CONFIG.SYS file, MS OS/2 enables the DOS session.

■ If you specify **protectonly=yes,** the DOS session cannot be started.

Configuring the DOS Session

While most of the configuration commands apply to all the sessions in MS OS/2, the following configuration commands are specific to the DOS session:

- **shell**
- **rmsize**
- **break**
- **fcbs**

These commands are described in the following sections.

Specifying the DOS Command Interpreter

To specify the DOS command interpreter, use the **shell** configuration command. The **shell** configuration command lets you specify the command interpreter that will be loaded and run in the DOS session.

The default shell for the DOS session is **command**. This means that if you do not include a **shell** configuration command in the CONFIG.SYS file, MS OS/2 searches for **command** in the root directory of your start-up disk and loads it into memory. If you specify another DOS shell to use, MS OS/2 will search for that shell program and load it into memory.

You will probably only need to use the **shell** command if **command** is not located in the root directory of the start-up drive. For example, suppose that **command** is not located in the root directory of your start-up drive (drive C), but it is in the OS2 directory. In this case, you would place the following line in your CONFIG.SYS file:

shell=c:\os2\command.com /p /e:512

This tells MS OS/2 to load **command** from the OS2 directory instead of from the root directory of drive C.

Another reason for using the **shell** configuration command is to specify options to the DOS-session command interpreter. **Command** has options that let you permanently keep a copy of **command** in memory, run a command or program, or specify the size of the command interpreter's environment.

For information about **command** and its options, see the *Microsoft Operating System/2 Desktop Reference*.

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Setting the Amount of Memory for DOS Applications

To set the amount of memory reserved for DOS applications, use the **rmsize** configuration command. Up to 640K can be reserved.

The default size depends on the total memory installed in your computer. It is the amount of memory installed below 1024K (either 512K or 640K).

To use this command, type **rmsize=** followed by the number of kilobytes you want to reserve for DOS applications. For example, to reserve 640K of memory for use by processes running in the DOS session, add the following line to your CONFIG.SYS file:

rmsize=640

Remember that some of the total memory is reserved for MS OS/2 itself.

Setting CTRL+C Checking

To turn CTRL+C checking on or off, use the **break** configuration command. The default setting is **break=off**.

Normally, MS OS/2 only checks to see whether you have pressed CTRL+C while it is reading from your keyboard or sending something to your screen or printer. However, if you turn CTRL+C checking on, MS OS/2 will check to see whether CTRL+C has been pressed whenever it is reading from or writing to a disk.

For example, to turn CTRL+C checking on, add the following line to your CONFIG.SYS file:

break=on

Suppose you want to stop a file from being sorted. If **break=on** is in your CONFIG.SYS file, you can press CTRL+C to stop the sorting process.

To turn CTRL+C checking off again, change the line to the following:

break=off

Specifying the Number of Open File-Control Blocks (FCBs)

To specify the number of open file-control blocks (FCBs), use the **fcbs** configuration command.

Although it is recommended that new programs use file handles to access files, some older DOS applications use data structures called file-control blocks (FCBs) to control open files. If your application uses FCBs, you can use the **fcbs** configuration command to specify the

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maximum number of files controlled by FCBs that can be opened con-
currently. The command will also specify the number of files opened
with FCBs that are protected against automatic closure.

By default, up to 16 FCB files can be opened concurrently, and all but
eight files can be automatically closed. You should only use the **fcbs**
command to change these values if your application requires you do so.

To use this command, type **fcbs=** followed by the total number of
FCBs that can be open concurrently (1–255) and the total number of
files that cannot be closed automatically (0–255).

For example, to open as many as four files with FCBs and to protect
the first two files from being closed, add the following line to your
CONFIG.SYS file:

fcbs=4,2

The number of files that are protected from closure must be less than
or equal to the total number of open files.

Modifying Multitasking Features

MS OS/2 provides several commands that let you modify its multitask-
ing features. Although most users won't need to use these commands at
all, there may be times when you are advised to change these features
to enhance how applications run under MS OS/2. The following com-
mands let you modify multitasking features of MS OS/2:

- **threads**
- **maxwait**
- **priority**
- **timeslice**

These commands are described in the following sections.

Specifying the Maximum Number of Threads

To specify the maximum number of threads that you can create at a
time, use the **thread** configuration command.

MS OS/2 allocates at least one thread for every running program. A
program may request additional threads if the program needs to per-
form tasks simultaneously. Typically, a running MS OS/2 system uses
many threads.

There is a system-wide limit on the number of threads that can be created. During installation, MS OS/2 sets the number of threads to 128. About 40 threads are used by MS OS/2, and the remaining threads are available for other programs. If you know that you will be running many programs that have a large number of threads, you might want to increase the number of threads that can be created at one time by using the **threads** configuration command.

To use this command, type **threads=** followed by the maximum number of threads you want to create at one time. You can specify any value from 64 to 255.

For example, to increase the number of threads from 128 (the default) to 255, add the following line to your CONFIG.SYS file:

threads=255

Be aware that as the number of threads is increased, a small amount of memory is also used up.

Specifying the Maximum Process-Waiting Time

To specify the maximum amount of time any active process must wait before being run, use the **maxwait** command. If that time elapses, the waiting process receives a boost in priority for one execution cycle (also called a *time slice*).

In a multitasking environment, each process that runs is assigned a priority level, which determines how often a process can run. If a process has a high priority, it will be granted permission to run more often than a process with a low priority. Thus, a low-priority process might wait a long time before being granted access to the CPU.

To use the **maxwait** command, type **maxwait=** followed by the number of seconds a process waits before receiving the priority boost. You can specify any value from 1 to 255 seconds. The default is 3 seconds.

For example, suppose that you want to make background programs, which normally have low priority, run faster. You could specify that you want a process to wait only one second before receiving a priority boost by placing the following line in your CONFIG.SYS file:

maxwait=1

Note that this will increase the speed of low-priority processes (such as background processes); however, it will also decrease the speed of high-priority processes (such as foreground processes).

Disabling Dynamic Priority Assignments

The **priority** configuration command enables or disables the normal dynamic priority-allocation scheme. Dynamic priority scheduling means that MS OS/2 adjusts priority levels according to changing circumstances.

MS OS/2 threads are classified and run in three categories: general priority, time-critical priority, and low priority. In the general-priority category are the background, foreground, and interactive subcategories. Because MS OS/2 is a multitasking operating system, the priority levels of threads that belong to these subcategories are modified dynamically if they change to a different subcategory (for example, from foreground to interactive). This, in turn, changes how often a thread will run.

For example, if you type the following, CPU resources are allocated on a first-come, first-served basis:

priority=absolute

By default, **priority** is set to **dynamic**. Unless you are specifically advised to do so, it should not be necessary to ever change this setting. Note that this command interacts with the **maxwait** command described earlier.

Setting the Time-Slice Values

To identify the minimum and maximum amount of time that MS OS/2 may dedicate to a given process before it must check on other processes, use the **timeslice** command. A time slice is an interval of time used by MS OS/2 to schedule the threads of a process. A process, such as an application, is often made of many threads. Each one of these threads is like a small program that can be scheduled as a separate unit.

To use this command, type **timeslice=** followed by the minimum and, optionally, the maximum time-slice value (in milliseconds). If you specify only the minimum time-slice value, the **timeslice** command sets maximum time-slice values automatically.

For example, if you are running an application that advises you to change the minimum time-slice value to 64 milliseconds, add the following line to your CONFIG.SYS file:

timeslice=64

Unless an application specifically requires that the time-slice value be changed, you should not do so.

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Managing System Memory

The following MS OS/2 configuration commands help your system manage memory efficiently:

- **diskcache**
- **memman**
- **swappath**
- **buffers**

These commands are described in the following sections.

Setting Up a Disk Cache

You can enable disk caching and specify the number of kilobytes of memory allocated for the disk cache by using the **diskcache** command. Since reading from a disk cache in memory takes less time than reading from storage, using a disk cache makes your system's response much quicker. When disk caching is enabled and a program instructs the system to read from your hard disk, the system stores what it reads in the memory disk cache. When the program instructs the system to read from the hard disk again, the system reads the data in the cache before going out to the hard drive.

To allocate a 512K disk cache on your system, add the following line to your CONFIG.SYS file:

diskcache=512

If there is no **diskcache** command entered in your CONFIG.SYS file, MS OS/2 does not enable disk caching, and no cache space is allocated.

Enabling Memory Swapping and Moving

Using the **memman** command, you can tell MS OS/2 whether or not to use the memory-management techniques of swapping and moving.

Swapping is a technique by which some data segments in memory are written to a disk-swap file, allowing the memory that they were using to be reclaimed for another purpose. Later, the swapped data segment is reloaded into memory.

Moving is a technique by which MS OS/2 can move blocks of storage around so that unused areas of storage can be combined into larger areas, as needed by a program or application.

Suppose you are running a telecommunications program that loses its connection if it cannot respond to incoming data within a specified time frame. To prevent MS OS/2 from swapping segments of the program out to the hard disk and possibly preventing a timely response, add the following line to your CONFIG.SYS file:

memman=noswap

The **memman** command can be used in any one of the following forms:

memman=noswap,nomove
memman=swap
memman=swap,move
memman=noswap
memman=noswap,move

If you specify just **swap** or **noswap**, **move** is the default.

Using a Disk-Swap File

You can specify the location of the disk-swap file by using the **swap-path** configuration command. A disk-swap file is a file that keeps track of code or data that is temporarily moved out of memory while another programs runs. The **swappath** command is used in conjunction with the **memman** command.

Suppose, for example, that you want MS OS/2 to write the swap file to the SWAPFILE directory on your hard disk (drive C). To do this, add the following lines to your CONFIG.SYS file:

memman=swap,move
swappath=c:\swapfile

If the **swappath** command is not specified in your CONFIG.SYS file, MS OS/2 writes the disk-swap file to the root directory of the drive from which your system is started.

Note If you are using the **swappath** command, make sure your system has ample space available. The minimum size of a disk-swap file is 512K.

Changing the Number of Disk Buffers

You can change the number of disk buffers (work areas in memory) by using the **buffers** configuration command. MS OS/2 uses disk buffers as a temporary work space while reading and writing data.

ساسسس   Suppose that you want to change the number of buffers to 15. To do this, add the following line to your CONFIG.SYS file:

buffers=15

Each disk buffer is a 512-byte block of memory. You may specify from 1 to 100 buffers. The default value is 30 buffers.

Setting Up Device Drivers

You can set up a device driver by using the **device** configuration command. A device driver is a program that tells MS OS/2 how to use devices in your system. These devices include items like the keyboard, the monitor, the disk drives, the system clock, and pointing devices such as a mouse. For example, if you are using a Microsoft Serial Mouse with Presentation Manager on an IBM PC/AT or a compatible computer, your CONFIG.SYS file needs to contain the following **device** commands:

device=pointdd.sys
device=mousea02.sys

This example directs MS OS/2 to look for the pointer device and mouse drivers. When MS OS/2 loads these drivers, it enables MS OS/2 and DOS programs to use the mouse.

For more information about MS OS/2 device drivers, see Chapter 14, "Using MS OS/2 Device Drivers."

Setting Up Your Environment

One of the steps involved in setting up your system environment is to define the way you want your system to perform. This section describes how to set environment variables, and how to run programs that set up your system.

Environment variables are ASCII strings that can be assigned values of your choice. The collection of these strings is known as the *environment*. A small part of memory is reserved for storing environment variables. When a value is stored as an environment variable, it can be used by any program in the session.

Setting Environment Variables

To assign values to environment variables, use the **set** configuration command. To use this command, specify the environment variable name, followed by the value(s) it will be replaced by. Any changes made with the **set** command affect only the current session.

Environment variables commonly set in your CONFIG.SYS file include PATH (directory search path) and DPATH (data search path). Programmers often set the LIB (library search path), INCLUDE (include-file search path), and TMP (temporary-file search path) environment variables in their CONFIG.SYS file. You can also define and set your own environment variables.

For example, to instruct MS OS/2 to search the working directory first, the BIN directory on drive C second, and the OS2 directory on drive C third, add the following line to your CONFIG.SYS file:

set path=c:\bin;c:\os2

Inheriting Environment Variables

Normally, environment variables such as PATH and DPATH are set up in your CONFIG.SYS file. The first time **cmd** is run, these environment variables are used to set up the initial working environment.

When you start **cmd** from Start Programs, the new session inherits the environment variables found in the CONFIG.SYS file. If you start **cmd** from an existing session, however, the new version of **cmd** inherits the environment variables of the current session. If you have modified any environment variables, the current environment may not be the same as the environment that was set up in the CONFIG.SYS file.

Starting a Program When You Start Your System

You use the **run** configuration command to specify a program that you want started in the background at the time you start or restart your system.

Suppose that you would like to start a keyboard speed-up program called Speedkey each time you start MS OS/2, and that this program can be found in the root directory of drive C. To do this, add the following line to your CONFIG.SYS file:

run=c:\speedkey.exe

Keep the following points in mind when you are using the **run** configuration command:

- You can specify multiple **run** commands in your CONFIG.SYS file.
- You cannot specify a batch program in a **run** command.
- MS OS/2 processes **run** commands in the order in which they appear in the CONFIG.SYS file.
- Before processing **run** commands, MS OS/2 processes all **device** commands.
- Programs specified by the **run** command are started before initialization of the user interface.

Setting Up Code-Page Support

MS OS/2 provides national-language support through the use of *code pages*. A code page is a 256-character set that MS OS/2 recognizes and processes. MS OS/2 supports five code pages: United States (437), Multilingual (850), Portuguese (860), French-Canadian (863), and Nordic (865). New programs, including Presentation Manager, use the multilingual code page. If you have a program written to support one of the older code pages, you will need to set up the code page during installation or by modifying your CONFIG.SYS file.

You can set up one code page for a single country, or you can set up two code pages to enable code-page switching. If you set up two code pages, you can later use the **chcp** command to switch back and forth between the two code pages. This command is described in Chapter 7, "Running Cmd." Along with code-page switching, you can switch between keyboard layouts of two different countries by using the **keyb** utility. This utility is described in Chapter 8, "Using MS OS/2 Utilities."

If you are using the United States version of MS OS/2, the correct code-page information is set up automatically for you during installation. If, however, you want your computer's keyboard, screen, and printer to be customized to support characters and keyboard layouts for countries other than the United States, you must modify the default code-page information.

Normally, you modify code-page information during installation. On-screen messages prompt you for the country you wish to support. This information is written to your CONFIG.SYS file. If you want to change code-page information after installation is complete, follow the instructions in this section to modify your CONFIG.SYS file.

To set up code-page support for a country other than the United States, you must do the following:

- Set the country code for your country by using the **country** config-uration command.
- Prepare code page(s) for the system by using the **codepage** config-uration command.
- Prepare devices for use with the code page(s) you have prepared by using the **devinfo** configuration command.

The following sections describe how to use each of these commands in your CONFIG.SYS file.

After you have specified the country code and code page(s) to be used, and after you have prepared devices for use with code pages, restart your computer. This causes MS OS/2 to read the information in your CONFIG.SYS file and to load the proper code page(s) in memory.

Supported Countries

The following list shows each country (or language) that is supported by MS OS/2 and its related country code, default code-page assignment, keyboard code, and keyboard subcode. You use the values in this list when you add the **country**, **codepage**, and **devinfo** configuration com-mands to your CONFIG.SYS file, and when you use the **keyb** utility.

Country	Country code	Code pages	Keyboard code	Keyboard subcode
United States	001	437,850	US	103
Canada (French)	002	863,850	CF	058
Latin America	003	437,850	LA	171
Netherlands	031	437,850	NL	143
Belgium	032	437,850	BE	120
France	033	437,850	FR	189, 120
Spain	034	437,850	SP	172
Italy	039	437,850	IT	141, 142
Switzerland (French)	041	437,850	SF	150F
Switzerland (German)	041	437,850	SG	150G
United Kingdom	044	437,850	UK	166, 168
Denmark	045	865,850	DK	159
Sweden	046	437,850	SV	153
Norway	047	865,850	NO	155
Germany	049	437,850	GR	129
Australia	061	437,850	—	—
Portugal	351	860,850	PO	163
Finland	358	437,850	SU	153

The primary code page is listed first, followed by the secondary code page. Notice that the multilingual code page (850) is supported by almost all countries.

Note Although not shown in the list, the following countries or languages are also available with special versions of MS OS/2: Arabic, Asia, Hebrew, Japan, Korea, and Taiwan.

Setting the Country Code

To define country-dependent information such as time, date, and currency conventions, use the **country** configuration command. To use this command, type **country=** followed by the country code and the name of the directory that contains the file COUNTRY.SYS. By default, MS OS/2 assumes that this country-dependent information is stored in a file called COUNTRY.SYS, and that this file is located in the root directory on your start-up drive. If your COUNTRY.SYS file is located in a different directory or drive, type the drive, directory path, and filename after the country code.

For example, if your COUNTRY.SYS file is located in the OS2 directory on drive C, you would type the following to specify the country code for France:

country=033,c:\os2\country.sys

The country code 033 sets country-specific information for France.

Preparing Code Pages

To select the code page(s) that will be prepared for use, use the **codepage** configuration command. To use this command, type **codepage=** followed by one or two code-page numbers. If you are preparing two code pages, separate the two numbers with a comma.

The following are the valid code-page numbers:

Number	Code Page
437	United States
850	Multilingual
860	Portuguese
863	French-Canadian
865	Nordic

For example, to prepare code pages 437 (U.S.) and 850 (Multilingual), type the following:

codepage=437,850

If you prepare two code pages, you can later use the **chcp** command to switch back and forth between the two character sets. See the *Microsoft Operating System/2 Desktop Reference* for the character sets for code pages 437, 850, 860, 863, and 865.

Preparing Devices for Use with Code Pages

To prepare your keyboard, display, and printer so that they can use the code pages that you specified in the **codepage** configuration command, use the **devinfo** configuration command. One **devinfo** command is required for each device you are preparing.

The **devinfo** command for your keyboard specifies your keyboard layout and the file that contains the keyboard translation tables. To set up your keyboard for use with code pages, type **devinfo=kbd** followed by a keyboard code, and the drive, directory path, and filename of the keyboard translation-table file. By default, MS OS/2 supplies these tables in a file called KEYBOARD.DCP.

The **devinfo** command for your display specifies the display name and the file that contains a video-font table for displaying characters in each of the supported code pages. To set up your display for use with code pages, type **devinfo=scr** followed by the type of graphics adapter you have, and the drive, directory path, and filename of the file that contains the system code pages for the display. The file VIOTBL.DCP contains the screen translation table.

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You can specify one of the following types of graphics adapters:

- EGA
- VGA

The **devinfo** command for your printer specifies the printer type, the printer name, and the file that contains a printer-font table for each code page supported by MS OS/2. To set up your printer for use with code pages, type **devinfo=** followed by the printer type (PRN, LPT1, LPT2, or LPT3), the printer name (4201 or 5202), and the drive, directory path, and filename of the file that contains the printer-font tables (4201.DCP or 5202.DCP).

If your computer includes code-page information in read-only memory (ROM), use the ROM specification after the printer-font-table file to specify the code page and font identification number for each ROM or printer cartridge. If you don't specify multiple fonts or font identification numbers, **devinfo** uses zero as the font identification number.

For example, to prepare an EGA display and a French keyboard for use, and to prepare the LPT1 printer (model 4201) for use with code page 437 contained in ROM, you could add the following lines to your CONFIG.SYS file:

devinfo=scr,ega,c:\os2\viotbl.dcp
devinfo=kbd,fr,c:\os2\keyboard.dcp
devinfo=lpt1,4201,c:\os2\4201.dcp,rom=(437,0)

Remember that you must have one **devinfo** command for each device on your system that will be using code pages.

Controlling System Tracing

The system trace is a record of actions, such as hardware interrupts or functions, that are taken or processed by the operating system while it runs. Recording these events can be helpful in developing programs for MS OS/2. There are two CONFIG.SYS commands that control system tracing: **tracebuf** and **trace**.

In addition to these commands, see the *Microsoft Operating System/2 Desktop Reference* for information about the **trace** and **tracefmt** utilities.

Setting the Size of the System-Trace Buffer

To set the size of the system-trace buffer, place a **tracebuf** command in your CONFIG.SYS file. The system-trace buffer is where system-trace events are stored. If you enable tracing, but do not specify the size of the trace buffer, a 4K buffer is automatically set up for you.

To use the **tracebuf** command, type **tracebuf=** followed by the size of the trace buffer (in kilobytes). The size can be from 1 to 63K. For example, to set up a trace buffer of 8K, add the following line to your CONFIG.SYS file:

tracebuf=8

A trace buffer of between 4K and 8K is usually enough for most trace activities.

Turning Tracing On or Off

To turn tracing on or off for some or all events, use the **trace** configuration command. To use this command, you should specify an event code that corresponds to a type of system activity, such as file-system events. The event code must be a decimal number from 0 to 255.

To turn tracing on, type **trace on** followed by one or more event codes. Typing **trace on** without an event code records all system trace events. To turn tracing off, type **trace off** followed by one or more event codes. Typing **trace off** without an event code cancels the recording of all system-trace events.

You can selectively turn on only certain event codes. For example, to turn on only the system-trace events 0 and 1, add the following lines to your CONFIG.SYS file:

trace=off
trace=on 0, 1

Or, you can selectively turn off certain events. If you want to turn on tracing for all events except 31 through 34, add the following lines to your CONFIG.SYS file:

trace=on
trace=off, 31, 32, 33, 34

You can use the **tracefmt** utility to view trace-event records. For more information about using **tracefmt**, see Chapter 8, "Using MS OS/2 Utilities."

14 Using MS OS/2 Device Drivers

Computer
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Introduction

A device driver is a program that tells MS OS/2 how to use a device in your system. Devices in your system include the keyboard, monitor, and printer, which are used for input or output.

MS OS/2 contains various device drivers, including device drivers for the keyboard, monitor, printer, floppy-disk drive, hard-disk drive, and clock. MS OS/2 automatically loads these drivers during installation.

MS OS/2 also contains device drivers that you use with optional devices. These include drivers for using a serial communications port, an external floppy-disk drive, and a pointing device such as a mouse. You need to set up these device drivers, since MS OS/2 does not load them automatically.

There are additional MS OS/2 device drivers that work with a device in your system to support or enhance its capabilities. These include drivers for using ANSI escape sequences or virtual disk drives. These drivers also need to be set up.

MS OS/2 has many device drivers, including those for devices mentioned above. However, there are many more, and they are generally provided along with the device.

For more information about using a specific device driver, see the *Microsoft Operating System/2 Desktop Reference*.

Setting Up an MS OS/2 Device Driver

Setting up a device driver consists of telling MS OS/2 the name of the driver to load and where it is located on your system. You do this by using the **device** configuration command, as described in Chapter 13, "Using MS OS/2 Configuration Commands." This chapter describes those device drivers that you need to set up.

In general, if a device driver is not located in the root directory of the disk drive from which you start your system, you need to specify the full path in the **device** command.

You can set up a device driver on your system without running the installation program again by using the **ddinstal** utility. **Ddinstal** copies device-driver files to your system and adds the appropriate **device** command to your CONFIG.SYS file. To use the **ddinstal** program, do the following:

▶ At the OS/2 command prompt, type **ddinstal** and press ENTER.

You are prompted to insert the disk that contains the device driver to be installed and to press ENTER when ready. **Ddinstal** looks for a .DDP (device-driver-profile) file for the information it will need in order to add the appropriate **device** command to the CONFIG.SYS file. You are then prompted to insert the MS OS/2 Installation disk and to restart your system. (You need to use the Installation disk, but you won't go through the complete installation process again.) When the system restarts, the **ddinstal** utility continues the device-driver installation. When the program is complete, restart your system by pressing CTRL+ALT+DEL.

Changing the Display Device Driver

During installation, you tell MS OS/2 what kind of display device you have. MS OS/2 then loads the appropriate display device driver. If you replace your display device with a new display device, you may need to change the display device driver.

To change the display device driver, follow these steps:

1 Insert the MS OS/2 Installation disk in your floppy-disk drive.
2 Turn on your computer. If your computer is already on, restart your system by pressing CTRL+ALT+DEL.
3 At the first screen, press ESC. This takes you to the command prompt.
4 Change to the C:\OS2\DLL directory.
5 Copy the new display device driver to DISPLAY.DLL.
6 Remove the Installation disk from your floppy-disk drive, and restart your computer by pressing CTRL+ALT+DEL.

Using ANSI Escape Sequences

You can use ANSI escape sequences in a DOS session by setting up the ANSI.SYS device driver. ANSI escape sequences let you move the cursor, set the color for characters, and set the number of character rows and columns for the screen. Many programs use ANSI escape sequences to provide screen output that is clear and easy to read.

In most cases, the program you're using generates the ANSI escape sequences. For example, terminal-emulation programs often pass ANSI escape sequences from a program on the mainframe computer to your screen. The ANSI escape sequences are correctly displayed only if you have set up the ANSI.SYS device driver. You can direct the system to

load the ANSI.SYS device driver by adding the following line to your CONFIG.SYS file:

device=ansi.sys

This example directs MS OS/2 to look for the ANSI.SYS driver in the root directory of the drive from which you start your system, and to load the driver if it's found. When MS OS/2 loads the device driver, it enables the ANSI escape sequences for the DOS session, but it does not enable them for full-screen OS/2 sessions. In a full-screen session, use the **ansi** utility to enable ANSI escape sequences for the screen.

If the ANSI.SYS driver is not located in the root directory, you need to specify the complete path, as follows:

device=c:\os2\ansi.sys

This example directs MS OS/2 to look for the ANSI.SYS driver and load it from the OS2 directory.

If you're programming and designing a display screen, you may want to use ANSI escape sequences. Each escape sequence is a series of characters, beginning with the escape character (ASCII code 27). For a list of the escape sequences and a description of what they do, see Appendix A, "ANSI Escape Sequences."

Using a Serial Communications Port

You can use your system's serial communications port by setting up the appropriate communications-port device driver. A communications port is an adapter to which the cable of a communications device is attached. Devices such as modems and serial printers are connected to this port.

Before you set up a communications-port device driver, you must choose the driver that works with your hardware. See the following list to find the driver that matches your hardware:

Driver	Hardware
COM01.SYS	IBM PC/AT or compatible computer
COM02.SYS	IBM PS/2

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To direct MS OS/2 to load the communications-port driver, add the following line to your CONFIG.SYS file:

device=c:\os2\com01.sys

This example directs MS OS/2 to look for the communications-port driver in the OS2 directory of the start-up drive. When this driver is loaded, it enables MS OS/2 and DOS programs to use the serial communications ports on your IBM PC/AT or a compatible computer.

To use a communications port, you need to set up the port in addition to specifying the device driver. You set up a communications port by using Control Panel or by using the **mode** command.

Note If you want to use a Microsoft Serial Mouse, the command **device=c:\os2\mousea02.sys** must appear before the command **device=c:\os2\com01.sys** in your CONFIG.SYS file.

Using a Logical Drive Letter

You can use a logical drive letter to access a disk by setting up the EXTDSKDD.SYS device driver. A logical drive letter, in this case, is a name for a physical disk drive. (The logical disk drives that you can set up in an extended partition on your hard disk are also parts of a physical disk drive, but they're a little different from the logical drives that you use with EXTDSKDD.SYS.) Using a logical drive letter, you can name an external disk drive, or you can assign a second name (an alias) to a disk drive and copy files to and from that same disk drive.

To direct MS OS/2 to load the EXTDSKDD.SYS device driver, add the following line to your CONFIG.SYS file:

device=c:\os2\extdskdd.sys /d:2

This example directs MS OS/2 to look for the EXTDSKDD.SYS device driver in the OS2 directory of the start-up drive. When MS OS/2 loads the driver, it allows your MS OS/2 and DOS programs to use an IBM external 720K 3½-inch floppy-disk drive. By default, this drive has 80 tracks, 9 sectors per track, and 2 read/write heads. The next available drive letter is assigned to the logical drive.

If you want to copy from the external disk drive to that same drive, add the following lines to your CONFIG.SYS file:

device=extdskdd.sys /d:2
device=extdskdd.sys /d:2

This example directs MS OS/2 to load the EXTDSKDD.SYS device driver. The first line associates a drive letter with the external disk drive. The second line associates an additional drive letter (an alias) with that same external drive. This allows you to copy data from the external disk drive described in the above example, to that same drive. The next available drive letters are assigned to the logical drives.

Using a Mouse

You can use a mouse with your DOS and MS OS/2 programs by setting up a mouse device driver and the device that moves a pointer on the screen. Many programs, especially Presentation Manager applications, use the mouse if it's available. Although a mouse is not required, it makes working with these programs easier and quicker.

Setting Up a Mouse Device Driver

To set up a mouse device driver, you must choose the driver that matches your mouse hardware and your computer. See the following list for a description of mouse drivers that are available with MS OS/2:

Driver	Mouse
MOUSEA00.SYS	Mouse Systems Mouse
MOUSEA01.SYS	Visi-On Mouse
MOUSEA02.SYS	Microsoft Serial Mouse for IBM Personal Computers (models 039-099 and 039-199)
MOUSEA03.SYS	Microsoft Bus (parallel) Mouse for IBM Personal Computers (models 037-099 and 037-199)
MOUSEA04.SYS	Microsoft InPort® (parallel) Mouse for IBM Personal Computers
MOUSEA05.SYS	IBM Personal System/2 Mouse for IBM PC/AT computers and compatible computers
MOUSEB00.SYS	Mouse Systems Mouse
MOUSEB01.SYS	Visi-On Mouse
MOUSEB02.SYS	Microsoft Serial Mouse for IBM Personal Computers (models 039-099 and 039-199)
MOUSEB05.SYS	IBM Personal System/2, Models 50, 60, 70, and 80 Mouse

Note MOUSEA*xx*.SYS drivers are used with IBM PC/AT computers or compatible computers. MOUSEB*xx*.SYS drivers are used with IBM Personal System/2 computers.

Regardless of which mouse driver you choose, you must always set up the POINTDD.SYS device driver for the mouse pointer. To direct MS OS/2 to load the pointer and mouse device drivers, add the following lines to your CONFIG.SYS file:

device=c:\os2\pointdd.sys
device=c:\os2\mousea04.sys

This example directs MS OS/2 to look for the pointer and mouse device drivers in the OS2 directory of the start-up drive. When MS OS/2 loads these drivers, it allows MS OS/2 and DOS programs to use the Microsoft InPort Mouse on an IBM PC/AT or a compatible computer.

Changing the Behavior of the Mouse Device Driver

You can use the **mode**, **serial**, and **qsize** options to change the behavior of the mouse device driver. The **mode** option lets you tell MS OS/2 in which session you'll be using the mouse. (Don't confuse the **mode** option of this command with the **mode** utility.) The **serial** option lets you specify the serial port to which the mouse is connected. The **qsize** option lets you control how much information your program receives from the mouse.

To tell MS OS/2 that you want to use the mouse in all sessions, add the following line to your CONFIG.SYS file:

device=c:\os2\mousea04.sys mode=b

This example directs MS OS/2 to use the mouse driver in Presentation Manager, full-screen, and DOS sessions. To use the mouse only in Presentation Manager and full-screen sessions, change the value that is specified for the **mode** option to **p** (protected mode). To use the mouse only in the DOS session, change the value that is specified for the **mode** option to **r** (real mode).

To tell MS OS/2 that your mouse is connected to the COM2 serial port, add the following line to your CONFIG.SYS file:

device=c:\os2\mousea02.sys serial=com2

This example directs MS OS/2 to look for the mouse at your system's COM2 serial port.

If you want to use the mouse with DOS applications such as Microsoft Word, then you also need to set up the EGA.SYS device driver. To direct MS OS/2 to load this driver, add the following line to your CONFIG.SYS file:

device=c:\os2\ega.sys

This example directs MS OS/2 to look for the driver in the OS2 directory of the drive from which you started MS OS/2.

Using a Virtual Disk Drive

You can use a virtual disk drive in full-screen and DOS sessions by setting up the VDISK.SYS device driver. Using a virtual disk drive, your system simulates a disk drive in memory, and provides quick access to files stored there. Because the virtual disk is actually a portion of memory, it's almost as fast as if the data were in memory.

You may want to use a virtual disk as a place in which temporary files are stored. Since the temporary file is deleted when it's no longer needed, there is no reason to save it on disk. To direct MS OS/2 to load the VDISK.SYS device driver, add the following line to your CONFIG.SYS file:

device=c:\os2\vdisk.sys

This example directs MS OS/2 to look for the VDISK.SYS driver in the OS2 directory of the drive from which you started MS OS/2. If the driver is found, MS OS/2 loads the driver and creates a 64K virtual disk with 128-byte sectors, 64 directory entries, and the name of the next available drive letter. (These values are the defaults.)

Any information stored in a virtual disk is lost when you restart your computer or turn off the power to your computer. If you use a virtual disk for temporary files, be sure to specify the appropriate drive letter with the **set temp** configuration command in your CONFIG.SYS file. This command tells MS OS/2 where to place all temporary files.

You can have more than one virtual disk drive; drive letters are assigned by the order in which the **device** commands appear in the CONFIG.SYS file. When you specify memory for a virtual disk, that memory is no longer available for other programs to use.

Since 64K is not very much space, you may want to increase the size of the virtual disk drive. To do this, add the following line to your CONFIG.SYS file:

device=c:\os2\vdisk.sys 128

This example creates a 128K virtual disk with 128-byte sectors and 64 directory entries.

You may also want to change the number of directory entries for the virtual disk drive. To increase the number of directory entries, add the following line to your CONFIG.SYS file:

device=c:\os2\vdisk.sys 256,128

This example creates a 256K virtual disk with 128-byte sectors and 128 directory entries. Note that a sector size is not specified; its position is designated by a comma. (If you wanted to specify all three values as something other than the default, you would separate them with spaces.)

When you specify a value for a directory entry, the value is rounded up to the nearest sector-size boundary. For example, if you give a value of 25, and your sector size is 512 bytes, 25 will be rounded up to 32, which is the next multiple of 16. There are 16 32-byte directory entries in 512 bytes.

The maximum size of a virtual disk depends on the amount of available memory in your system, but it cannot be larger than four megabytes. If the virtual disk size that is specified is too large to fit in memory, VDISK.SYS will try to make a virtual disk that is 16K. This may result in a virtual disk with a different number of directory entries than you specified.

When you start or restart your system, MS OS/2 displays information about any virtual disk it creates. The information includes the assigned drive letter, the size of the virtual disk, its sector size, and the number of directory entries. You can also use the **chkdsk** utility to determine the size of a virtual disk.

Appendixes

A ANSI Escape Sequences

Introduction

This appendix lists all of the escape sequences that can be used with the ANSI.SYS device driver in the DOS session, or with the **ansi** command in a full-screen OS/2 session or in **cmd** in a window.

ANSI escape sequences affect cursor positioning, erase functions, and screen graphics.

The sequences must be typed exactly as shown. No spaces are allowed.

Cursor Functions

The following functions affect the movement of the cursor.

Cursor Position

ESC[*row;col*H

or

ESC[*row;col*f

These two escape sequences move the cursor to the position specified by the parameters. When no parameters are provided, the cursor moves to the home position (the upper-left corner of the screen).

Cursor Up

ESC[*n*A

This sequence moves the cursor up *n* rows without changing columns. If the cursor is already on the top line, MS OS/2 ignores this sequence.

Cursor Down

ESC[*n*B

This sequence moves the cursor down *n* rows without changing columns. If the cursor is already on the bottom row, MS OS/2 ignores this sequence.

37	White foreground
40	Black background
41	Red background
42	Green background
43	Yellow background
44	Blue background
45	Magenta background
46	Cyan background
47	White background
48	Subscript
49	Superscript

The values 30 through 47 meet the ISO 6429 standard.

Set Mode

ESC[=sh

This sequence changes the screen width or type. The s variable can have one of the following numeric values:

Value	Function
0	40 × 25 black and white
1	40 × 25 color
2	80 × 25 black and white
3	80 × 25 color
4	320 × 200 color
5	320 × 200 black and white
6	640 × 200 black and white
7	Wraps at the end of each line

Reset Mode

ESC[=sl

The values for this escape sequence are the same as for Set Mode, except that the value 7 resets the mode that causes wrapping at the end of each line.

B Running DOS from Your Hard Disk

Introduction

This appendix describes how to add DOS files to your hard disk and create a DOS start-up disk. This will allow you run DOS on a system with MS OS/2 already installed on it. You may need to run DOS if you have DOS programs that cannot run in the DOS session of MS OS/2.

You can always run DOS on your system by starting your system from the original DOS start-up disk. You can, however, choose to keep most of the DOS files, except for a few start-up files, on your hard disk. You will still have to use a DOS start-up disk, but DOS will run faster if most DOS files are on your hard disk. By modifying the CONFIG.SYS and AUTOEXEC.BAT files on the DOS start-up disk, you can tell the system to look for DOS files on your hard disk instead of on your start-up disk.

Running DOS Programs

Most DOS applications can be run in the DOS session of MS OS/2 without problems. However, programs that have timing dependencies, that access the hardware directly, or that use DOS extended memory may not work correctly in MS OS/2. Here are a few examples of such programs:

- Programs that communicate through local area networks and that make or break connections
- Programs that directly access hardware to back up or restore files
- Block device drivers such as RAM disks
- Programs that use certain key combinations such as CTRL+ESC or ALT+ESC
- Programs that use plotters
- Programs that determine storage sizes by checking hardware RAM
- DOS communications programs

Creating a DOS Directory and Start-up Disk

To add the capability of running DOS, as well as MS OS/2, from your hard disk, you must create a DOS directory on your hard disk and copy the DOS files to it, make a new DOS start-up disk, and edit the CONFIG.SYS and AUTOEXEC.BAT files that are on the new DOS start-up disk. The following sections describe how to do these things.

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The instructions in this appendix assume that you have MS OS/2 installed on your hard disk, and have the original DOS system disk and a blank, formatted 1.2-megabyte or 1.44-megabyte floppy disk.

Copying DOS Files to Your Hard Disk

To copy DOS files to your hard disk, do the following:

1 Restart your system by turning on your computer or by pressing CTRL+ALT+DEL. Change to the root directory on drive C and type the following to make a directory to hold DOS files:

mkdir \dos

(While the directory name DOS is used here, you may choose any valid directory name.)

2 Insert the original DOS start-up disk in drive A and type the following to copy the DOS files to your hard disk:

copy a:*.* c:\dos

Making a DOS Start-up Disk

To make a new DOS start-up disk, do the following:

1 Insert the original DOS start-up disk that contains COMMAND.COM, CONFIG.SYS, and AUTOEXEC.BAT in drive A.

2 Make a copy of this disk by typing the following:

diskcopy a: a:

Diskcopy will prompt you at appropriate times to insert the source disk (the original start-up disk) or destination disk (a blank, formatted disk).

The copy becomes your DOS start-up disk. Before you can use it to start DOS, however, you must edit the DOS CONFIG.SYS and AUTOEXEC.BAT files, as described in the following section.

Editing CONFIG.SYS and AUTOEXEC.BAT

You can use a text editor to modify the CONFIG.SYS and AUTOEXEC.BAT files on the start-up disk.

Note Separate CONFIG.SYS and AUTOEXEC.BAT files exist for DOS and MS OS/2. Be sure to modify only the files on your DOS start-up disk.

To modify CONFIG.SYS, do the following:

1 Insert your new DOS start-up disk in drive A.

2 Edit the **shell** configuration command so that it specifies the DOS directory that you have just created:

shell=c:\dos\command.com /p

3 Edit any **device** and **country** configuration commands so that they specify the new DOS directory.

To modify AUTOEXEC.BAT, do the following:

1 Insert your new DOS start-up disk in drive A.

2 Edit the **set comspec** configuration command so that it specifies the COMMAND.COM file that is in the new DOS directory:

set comspec=c:\dos\command.com

3 Edit your path so it includes, at a minimum, the following:

set path=c:\dos

Starting DOS

To start DOS, do the following:

1 Insert the DOS start-up disk in drive A.

2 Restart your system by turning on your computer or by pressing CTRL+ALT+DEL.

To return to MS OS/2, remove the start-up disk from drive A and restart your computer.

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Terms

A

Action bar   See *Menu bar*.

Active   Describes a window or icon that is selected in Presentation Manager; the window or icon to which the next keystroke or command will apply. If a window is active, the title bar is a different color. If an icon is active, the System menu appears.

ANSI character set   The American National Standards Institute 8-bit character set. It contains 256 characters.

ANSI escape sequence   A sequence of ASCII characters, the first two of which must be the escape character and the left-bracket character, used to control the keyboard and computer screen. The ANSI character set was developed by the American National Standards Institute and can be used in a full-screen OS/2 session by using the **ansi** command. This character set can be used in the DOS session by installing the ANSI.SYS device driver by using the **device** command in your CONFIG.SYS file.

Application   A program used for a particular kind of work, such as word processing or database management. See also *Presentation Manager application*, *Full-screen OS/2 application*, and *DOS application*.

Application file   See *Program file*.

Archive attribute   Determines whether a file will be copied when you use the **xcopy**, **backup**, or **restore** utilities. See also *Attribute*.

Argument   Refers to switches, options, and/or variables accepted by an MS OS/2 command or other process.

Arrow pointer   A small symbol that appears in MS OS/2 and DOS applications if you have installed a mouse, and that indicates which area of the screen will be affected when you click the mouse button. The pointer usually is shaped like an arrow but changes shape during certain tasks.

ASCII character set   The American Standard Code for Information Interchange 8-bit character set. The set consists of the first 128 (0–127) characters of the ANSI character set.

Attribute   A changeable characteristic of a file; for example, an archive attribute. You use the **attrib** command to display and set file attributes.

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AUTOEXEC.BAT   A batch file that contains a series of DOS commands, and automatically runs when you start or restart your system. This batch file affects the DOS session only.

B

Background program   A program that cannot receive input and does not send output to the screen. See also *Foreground program*.

Batch processor   The part of the command interpreter that processes batch-file commands.

Batch program   An ASCII file that contains one or more MS OS/2 commands. MS OS/2 batch files have the extension .BAT in the DOS session, and .CMD in a full-screen OS/2 session. When a batch program is run, the commands are processed sequentially by **command** (in the DOS session) or **cmd** (in a full-screen OS/2 session).

Boot   See *Start*.

Buffer   A place in your computer's memory used to store information temporarily.

Byte   A unit of information used by a computer, usually eight consecutive bits that represent one character.

C

Check box   A small square box that appears in a Presentation Manager dialog box and that can be turned on or off. When the check box is turned on, an X appears in the box. Check boxes represent multiple options that you can set.

Choose   In Presentation Manager, to perform an action that carries out a command in a menu or dialog box. See also *Select*.

Click   To press and release a mouse button quickly. When you click a mouse button, you may hear and feel a faint click.

Cmd   The MS OS/2 command interpreter. **Cmd** translates what you type at the command prompt into instructions that your computer understands.

Code page   Defines a table that is used to set up foreign-language versions of MS OS/2. You can change your system's code page by using the **chcp** command.

Command   A word or phrase, usually found in a menu or typed at the command prompt, that you use in order to perform a task.

Command   The DOS command interpreter. **Command** translates what you type at the command prompt into instructions that your computer understands.

Command button   A large rectangular button that appears in a Presentation Manager dialog box and carries out or cancels an action when chosen. The Cancel button always cancels the command. The Enter button carries out the command. Sometimes, instead of Enter, the button that carries out the action will have a label that describes the action; for example, Delete. At times, choosing the button causes another dialog box to open. For example, if you choose the Help command button, the Help dialog box is displayed for the command.

Command interpreter   Provides a command-line interface that lets you run commonly used, "built-in" commands, as well as batch programs and MS OS/2 programs.

Command prompt   The character or characters that appear on the screen as part of the command line. The command prompt tells you that the computer is ready to receive input. You can customize the command prompt by using the **prompt** command.

Command-line interface   A user interface that allows the user to type commands on the command line.

CONFIG.SYS   A start-up file that contains configuration commands. These commands provide the information MS OS/2 needs to start your system.

Configuration   How your computer is set up. Configuration commands in the CONFIG.SYS file help you customize the way MS OS/2 runs on your computer.

Control Panel   A Presentation Manager application that you use to set up printers, change country settings and screen colors, and adjust other system settings such as the date and the time.

Cursor   Usually a blinking line or small box on the computer screen that shows where the next character you type will appear. See also *Selection cursor*.

D

Data file   A file made up of ASCII characters.

Data path   The place you tell MS OS/2 to look for data files (files with extensions other than .EXE, .COM, .BAT, or .CMD).

Default   Describes an option, command, or device that is automatically selected or chosen by the system. For example, in most Presentation Manager dialog boxes that contain command buttons, one of the buttons has a bold border when the dialog box appears, indicating that it is the default and will be chosen automatically if you press the ENTER key. You can override a default by selecting the appropriate option, command, or device.

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Device Components of your system's configuration that aren't actually part of the computer. Examples of devices are a modem, a printer, a mouse, and an external disk drive.

Device driver A program that controls how your computer and a device, such as a printer or monitor, interact. A device driver allows you to use devices with your computer. A printer driver is an example of a device driver. A printer driver lets you control printing and set options, such as paper size, for a particular printer.

Dialog box A rectangular box that appears when Presentation Manager needs further information before it can carry out a command or when Presentation Manager is providing you with information. For example, if you choose the Add command from the Program menu in Start Programs, a dialog box appears, asking for the name of the application that you want to add.

Direct-access method A way to choose a command or to select a menu in Presentation Manager by pressing the key that corresponds to the underlined character in the command or menu name.

DIRECTION keys The four arrow keys on your computer's keypad. The names of the individual DIRECTION keys refer to the direction the arrow points: the UP key, the DOWN key, the RIGHT key, and the LEFT key.

Directory Part of a structure for organizing your files into convenient groups. A directory is like a file drawer that holds a particular group of files. A directory can contain both files and other directories. These directories are sometimes called subdirectories. You can see the directories on your system by using File System or by typing the **dir** command at the command prompt.

Disk cache An extra buffer in which MS OS/2 stores information that it has recently read from your hard disk. When an application needs to read information from the hard disk, it looks first in the disk cache to see if the information is there.

DOS application An application designed to run with DOS. A DOS application can run with MS OS/2 only in the DOS session. See also *DOS session*.

DOS session A separate environment created in MS OS/2 in which you can run an application designed to work with DOS. The DOS session is almost like a separate computer, with 640 kilobytes of memory, that runs only DOS. You can run one application at a time in the DOS session. You can switch to other MS OS/2 applications by pressing ALT+ESC or to Task Manager by pressing CTRL+ESC.

Double-click To rapidly press and release a mouse button twice.

Drag To press and hold down the mouse button while moving the mouse. For example, you can move a Presentation Manager window to another location on the screen by dragging its title bar.

Drive icon   In Presentation Manager, the small symbol in the Directory Tree window in File System that represents the disk drives on your system.

Dynamic-link library   A separate file of MS OS/2 code that, when needed, is brought into memory, or "dynamically linked."

E

Environment   A place in your computer's memory where environment variables are stored. You define the environment by using the **set** command in the CONFIG.SYS file, in batch files, or from **cmd** or **command**. See also *Environment variable*.

Environment variable   Associates a string consisting of a drive, path, filename, or other information with a symbolic name that can be used by MS OS/2. You use the **set** command to define environment variables.

Error message   A message that appears on the screen if MS OS/2 detects a problem while processing a command or program. An error message contains a message identification number that consists of three letters followed by a four-digit number. You can get more information about a particular error message by typing **help** at the command prompt, followed by the message number.

Executable file   See *Program file*.

Expanded memory   Extra memory installed to use with DOS. MS OS/2 does not use expanded memory. If you have installed expanded memory on your computer, you should convert it to extended memory. See your extended-memory-board manual for details.

Extend a selection   In Presentation Manager, to select more than one item in a window.

Extended memory   Memory beyond the usual 1-megabyte limit of computers such as the IBM PC/AT and compatible models. To use it you must install an extended memory board. Extended memory can be used by MS OS/2.

Extended partition   A second, optional partition you may have on your hard-disk drive.

Extension   The period and three letters at the end of a filename. An extension identifies what kind of information a file contains. For example, the extensions .CMD and .BAT indicate that the file contains a batch program. Some applications append an extension to the files that you create with them. For example, files that you create with Bricks have the extension .BRK.

F

File control block (FCB) A data structure used to control open files in the DOS session.

File extension See *Extension*.

File handle An identification code for a file, which is assigned when the file is created or opened. An MS OS/2 program uses the file handle whenever it accesses (reads from or writes to) the file.

File System A Presentation Manager application that you use to view and organize your files and directories.

Filename The name of a file. MS OS/2 filenames consist of a base name containing no more than eight characters and a three-character extension. For example, BRICKS.EXE is the name of the file that contains the Bricks application. See also *Extension*.

Filter A term sometimes used to define utilities that take input from a device or file, process or "filter" the input, and then send it to an output device or file.

Foreground program A program that can receive input and send output. See also *Background program*.

Format To prepare a disk so that it can hold information. Formatting a disk erases whatever information was previously on it.

Full-screen OS/2 application Describes an MS OS/2 application that runs in its own full screen rather than as part of the Presentation Manager screen. Some full-screen applications can run in special windows, however, so that you can work with them in Presentation Manager.

Full-screen OS/2 session A separate environment where MS OS/2 applications run in a full screen. You do not see the Presentation Manager screen. You can start multiple full-screen sessions, almost as if you had multiple computers. From a full-screen session, you can switch to other applications by pressing ALT+ESC or to Task Manager by pressing CTRL+ESC.

G

Graphical environment See *Graphical user interface*.

Graphical user interface A user interface such as Presentation Manager, which offers you an environment of windows, menus, and dialog boxes in which you can work.

Grayed In Presentation Manager, describes a command or option that is listed in a menu or dialog box but cannot be chosen or selected. The command or option appears in gray type. For example, after you have enlarged a window to its full size, the Maximize command in the System menu is grayed.

H

Hidden file   A system file that cannot be viewed, such as BIOS.

I

Icon   In Presentation Manager, a small symbol that represents an application or a session that is running in memory. For example, the DOS icon represents the DOS session.

Icon area   The area along the bottom of the Presentation Manager screen where icons for applications or sessions appear. You can move icons from the icon area.

Inactive   Describes a window or icon that is not selected in Presentation Manager. See also *Select*.

Initialization   The process your computer goes through when it is first started or restarted. This process includes reading MS OS/2 start-up files.

Insertion point   The place where text will be inserted when you type. The insertion point usually appears as a flashing vertical line in Presentation Manager dialog boxes. The text you type appears to the left of the insertion point, which moves to the right as you type.

J

Job identifier   In Presentation Manager, a number that identifies a file waiting to be printed. You can see the job identifier listed in the work area of the Spooler Queue Manager application.

L

Label   Used as a parameter to the **goto** batch command, a label tells the batch program which part of the file to switch to. See also *Volume label*.

List box   A box within a Presentation Manager dialog box that lists available choices; for example, the areas of the screen that you can change colors for. The item that is selected in a list box is distinguished by the selection cursor, a dark bar surrounded by a dotted box. If there are more choices than can fit in the list box, the list box will have a scroll bar.

Logical drive   A way of naming an extended partition on your hard-disk drive.

Lost cluster   A section of a file no longer associated with any other file on a hard-disk drive. When a cluster is lost, MS OS/2 can't read, write to, or modify the data in those clusters. You use the **chkdsk** command to fix lost clusters.

M

Maximize box   The small box containing an up arrow that is located at the right of the menu bar in a Presentation Manager window. Mouse users can click the Maximize box to enlarge a window to its maximum size.

Menu   A group listing of available commands in a Presentation Manager window. Menu names appear in the menu bar near the top of the window. One menu, the System menu, is common to all Presentation Manager windows and is represented by the System-menu box in the upper-left corner of the window. You use a command from a menu by selecting the menu, then choosing the command.

Menu bar   The horizontal bar that lists the names of an application's menus near the top of a Presentation Manager window. The menu bar appears below the title bar of a window. This is sometimes referred to as the action bar in applications.

Message   A sentence or short paragraph of information that may appear on your screen, warning you about the consequence of some action you've taken or asking for additional information or verification. For example, when you attempt to shut down MS OS/2, you will see a message, asking if you really want to end all your programs.

Minimize box   The small box containing a down arrow that is located at the right of the menu bar in a Presentation Manager window. Mouse users can click the Minimize box to reduce a window to an icon.

Move   A technique by which MS OS/2 can move blocks of storage around so that unused areas of storage can be combined into larger areas, as needed by a program or application.

Multitasking   A feature of MS OS/2 that lets you run more than one program or process at the same time.

N

NUL   An option you have when you are redirecting output. Anything sent to NUL is discarded.

O

Option   A command argument that is not required.

Option button   A small round button that appears in a Presentation Manager dialog box and selects an option when set. Within a group of related option buttons, you can make only one selection.

P

Partition   A hard-disk drive can be organized into separate sections called partitions.

Path   A description of the location of a directory within the directory structure of the system. The path consists of one or more directory names. Each directory name is separated from the previous one by a backslash (\).

Pipe   The method of redirecting the output from one command and using it as input for the next command.

Point   To move the mouse pointer on the Presentation Manager screen until it rests on the item you want to select or choose.

Pointer   See *Arrow pointer*.

Port   A slot on your computer to which you can connect a printer, a modem, or other input or output device. MS OS/2 recognizes three printer ports (LPT1, LPT2, and LPT3) and three communications ports (COM1, COM2, and COM3).

Presentation Manager   The graphical user interface that is part of MS OS/2. See also *Graphical user interface*, *Presentation Manager application*, and *Presentation Manager session*.

Presentation Manager application   An application designed for the Presentation Manager graphical environment. These applications run in windows, and their commands are organized into menus. They also take advantage of other features of the Presentation Manager interface such as dialog boxes and icons.

Presentation Manager session   The environment that applications designed for Presentation Manager run in. In the Presentation Manager session, all the applications running on your system are represented— either running in windows or as icons. The DOS session and full-screen OS/2 session are represented as icons, as well.

Primary partition   The partition on your hard-disk drive that must contain system start-up files.

Print job   In Presentation Manager, a file waiting to be printed. You can check the status of print jobs by using the Spooler Queue Manager application.

Print queue   In Presentation Manager, a list of files waiting to be printed. You can look at this list by using the Spooler Queue Manager application.

Printer names   In Presentation Manager, the names you assign to a printer to identify it. You can create your own printer names. You create and assign the names by using the Control Panel application.

Program   A set of instructions, written in a computer language, that tells the computer how to perform a task.

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Program file   The file that contains a program. These files must have one of the following filename extensions: .CMD, .EXE, COM, or .BAT. In Presentation Manager, you can start an application by opening its program file in File System. Program files are also known as application files and executable files.

Prompt   See *Command prompt*.

Q

Queue   See *Print queue*.

Queue processor   In Presentation Manager, a program that prepares a file to be sent to the printer. A queue-processing program is copied to your hard disk when you set up MS OS/2 on your system.

R

Read-only attribute   Determines whether the contents of a file can be modified or not. See also *Attribute*.

Redirection   A feature that lets you take the output from one command and send it to a file instead of to the screen.

Replaceable parameter   A command option that you can define each time you run a batch program. You use replaceable parameters when you want to create a batch program and run it with different sets of data. A replaceable parameter is represented by a percent sign (%) followed by a digit from 0 through 9.

Restart   To press CTRL+ALT+DEL when your computer is already turned on. See also *Start*.

Restore   A command that restores files that were backed up by using the **backup** utility. The term "restore" is also used to describe the return of a window to the size and position it had before it was either shrunk to an icon or enlarged to its maximum size.

Restore box   The small box in a Presentation Manager window containing a down and up an arrow. It appears at the right of the menu bar after you have enlarged a window to its full size. Mouse users can click the Restore box to return the window to its previous size and position.

Root directory   Highest directory on a disk. It is represented by the backslash (\). The root directory is created when you format the disk. From the root directory, you can create other directories.

Run   To start an application.

S

Save   To store a file, or changes to a file, on a disk.

Scroll   In Presentation Manager, to move text or graphics up or down, or left or right, in order to see information that cannot fit on the screen. You usually use the DIRECTION keys or the mouse to scroll.

Scroll bar   A bar that appears at the right side and/or bottom of some Presentation Manager windows and in some dialog boxes. The scroll bar contains a scroll arrow at either end and a scroll box that moves within the scroll bar, reflecting your position in a file or a list. Mouse users can click parts of the scroll bar to scroll a file. Keyboard users use the DIRECTION keys to accomplish the same thing.

Scroll box   In Presentation Manager, the box within a scroll bar that you move by using either the mouse or the DIRECTION keys. Its position in the scroll bar corresponds to your general location in a file or dialog box (beginning, middle, or end).

Search path   The path that tells MS OS/2 where to look for a file or directory.

Sector   A place on a disk that contains the smallest amount of information that can be accessed at one time. See also *Track*.

Select   In Presentation Manager, to indicate the item that the next command you choose will affect. The way you select varies, depending on the task. See also *Choose*.

Selection cursor   In Presentation Manager, the mark, often a dark bar or dotted box, that shows you where you are working in a window or dialog box and what you have selected. The selection cursor varies, depending on where you are working. For example, in File System a dark bar shows you which disk drive or file you have selected. In a dialog box, a dotted box shows you which area of the dialog box you are working in.

Session   See *DOS session*, *Full-screen OS/2 session*, and *Presentation Manager session*.

Shortcut key   In Presentation Manager, a special key or key sequence, available for some commands, that you can press to carry out the command without first selecting a menu. The shortcut keys for a command are often listed on the menu to the right of the command name.

Spooler Queue Manager   A Presentation Manager application that organizes and controls printing. It allows you to print files and to view and control the jobs in the print queue. Spooler Queue Manager is started each time you start MS OS/2 unless you turn it off using Control Panel.

Standard error   The destination of error messages sent by your computer. The computer usually sends error messages to the screen, but you can use redirection to send them to another destination.

Standard input   The source of input to your computer. The computer usually gets its input from the screen, but you can use redirection to send it input from other sources.

Standard output   The destination of output from your computer. The computer usually sends output to the screen, but you can use redirection to send output to other destinations.

Start   There are two ways to start MS OS/2. One is to turn on your computer. There other is to press CTRL+ALT+DEL when your computer is already turned on.

Start Programs   A Presentation Manager application that you use to start other applications.

Start-up disk   The disk where your MS OS/2 start-up files are located. This can be a floppy disk or hard disk.

Start-up drive   The drive where your MS OS/2 start-up files are located. This can be a floppy-disk drive or hard-disk drive.

Start-up file   Files such as AUTOEXEC.BAT and CONFIG.SYS, which MS OS/2 looks at for information about how to start your system.

String   A sequence of related characters.

Subdirectory   A directory contained within another directory. All directories are subdirectories of the root directory.

Swap   A technique by which some data segments in memory are written to a disk-swap file, allowing the memory that they were using to be reclaimed for another purpose. Later, the swapped data segment is reloaded into memory.

Switch   To move from one application to another, or from one session to another. You can switch between applications by using the mouse, the keyboard, or Task Manager.

System menu   In Presentation Manager, the menu that appears on every application that runs in a window. Icons, some dialog boxes, and windows within application work-areas also have System menus. For applications running in a window and for icons and dialog boxes, System-menu commands move, change the size of, and close windows. You can also switch to Task Manager by using the System menu. For work-area windows, System-menu commands vary, depending on the application.

System-menu box   The small box that is located at the left in a window's title bar. If you have a mouse, you can click this box to display the System menu, or double-click it to close the window.

T

Task Manager   A Presentation Manager application that you use to switch among all the applications you have running on your computer.

Text box   A box in a Presentation Manager dialog box in which you
type information needed to carry out a command. The text box may
be blank when the dialog box appears, or may contain text if there is
a default option or if you have selected something applicable to that
command.

Text file   See *Data file*.

Thread   Part of an application or other process that can be scheduled
by MS OS/2 to run on its own.

Time slice   The amount of processing time the MS OS/2 scheduler
gives a thread before reassigning the CPU to another thread.

Title bar   The horizontal bar across the top of each Presentation Man-
ager window, which contains the name of the application in that win-
dow. The title bar also contains the System-menu box and the Maxi-
mize and Minimize boxes or the Minimize and Restore boxes.

Track   A place on a disk where information is stored. A track is made
up of sectors. See also *Sector*.

U

User interface   See *Graphical user interface* and *Command-line inter-
face*.

Utility   A program provided with MS OS/2 that is designed to perform
system-maintenance tasks such as copying files or formatting disks. For
example, **backup** is an MS OS/2 utility for creating backup copies of
your files.

V

Virtual disk   A disk drive simulated in memory, which provides quick
access to information stored there.

Volume label   An internal name on a disk. You should put a volume
label on each of your floppy disks to help you identify them.

W

Wildcard character   A character that can be included in a filename
to indicate any character or group of characters that might match that
position in other filenames. There are two wildcard characters you can
use: the question mark (?) and the asterisk (*). The question mark can
match one character; the asterisk can match zero or more characters.
For example, *.EXE represents all files in the directory that end with
the .EXE filename extension.

Window   In Presentation Manager, a rectangular area on your screen
in which you view an application. Every window has a title bar and may
have a menu bar and one or two scroll bars. See also *Work-area win-
dow*.

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Work area   In Presentation Manager, the area of a window where you do your work with the application. For example, the Start Programs work area contains a list of programs that you can start.

Work-area window   In Presentation Manager, windows that you can open within an application work area. For example, you can open directory windows within the File System work area.

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